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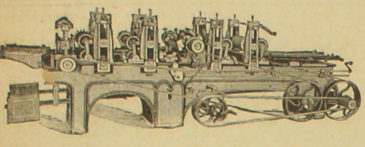

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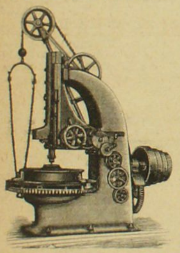

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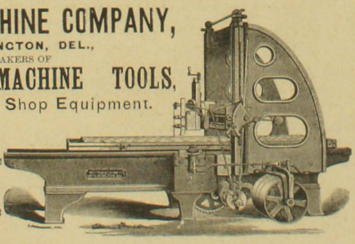

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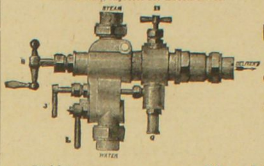

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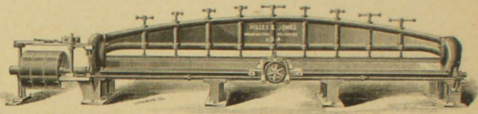

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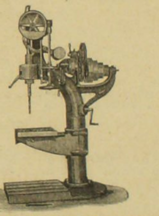

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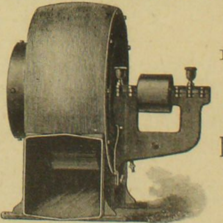

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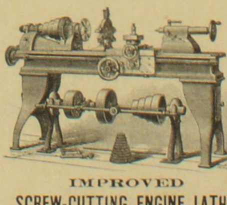

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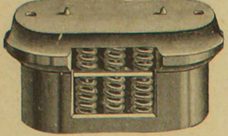

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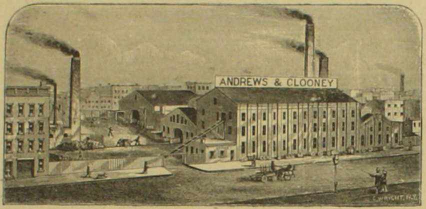

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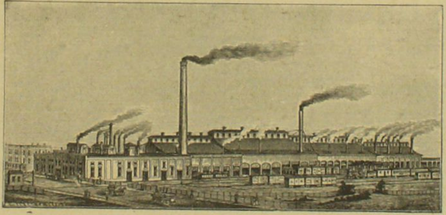

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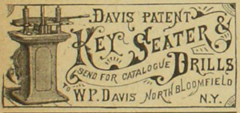

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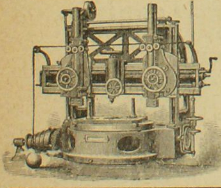

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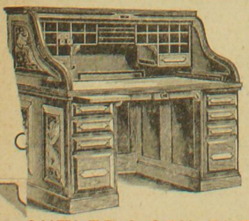

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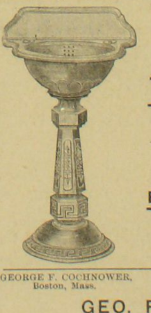

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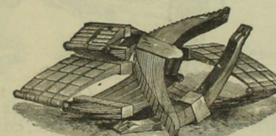

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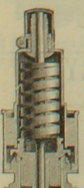

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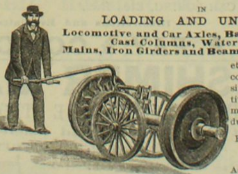

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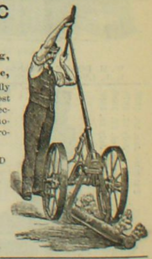

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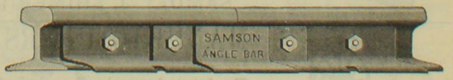

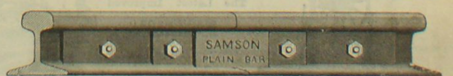

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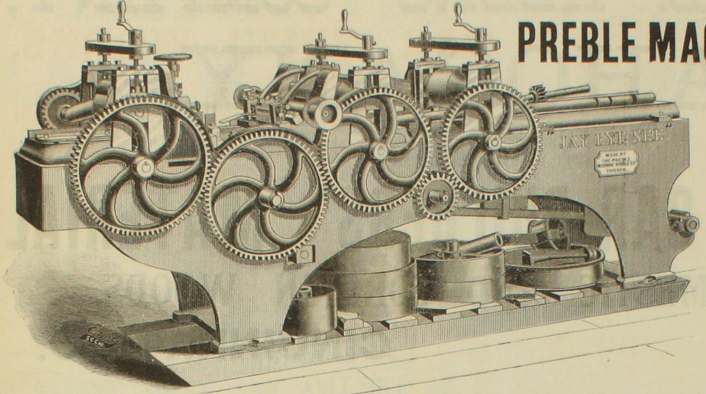
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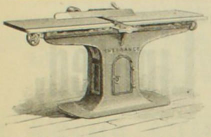
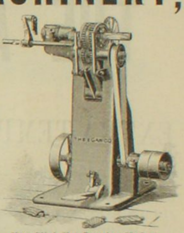
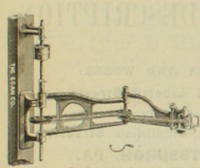
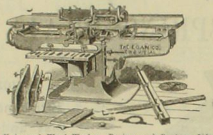
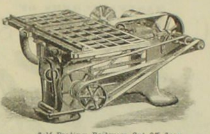
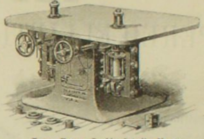

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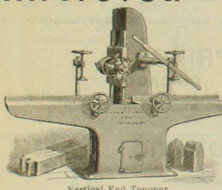
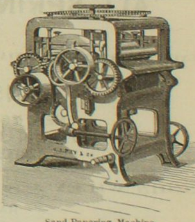

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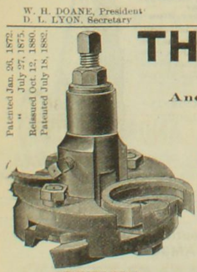
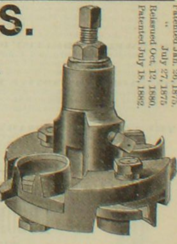

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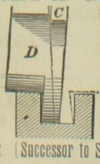

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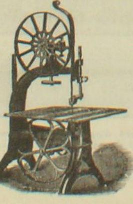
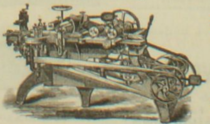
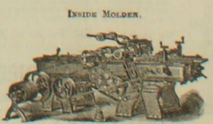

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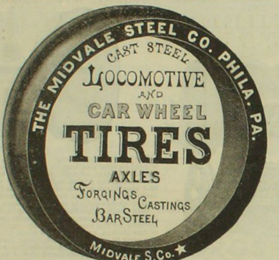

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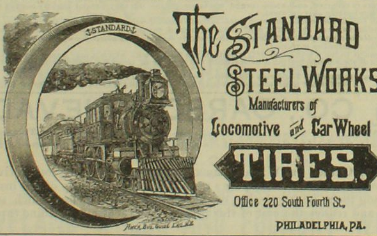

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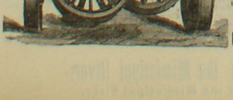

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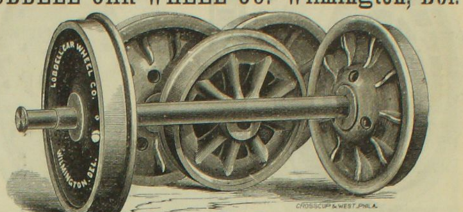
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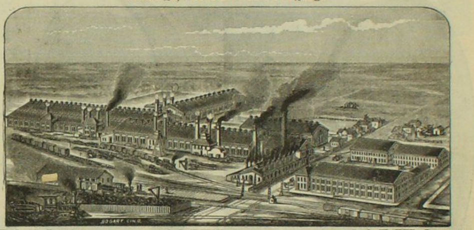
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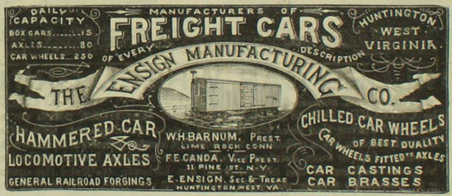

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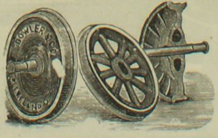
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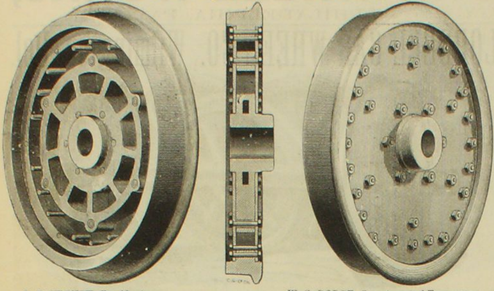

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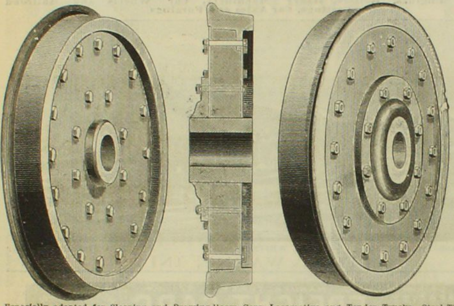

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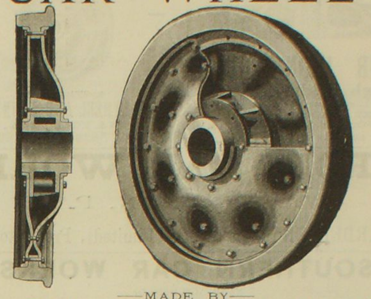

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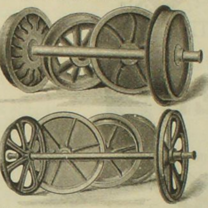

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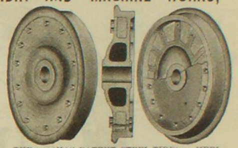

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The great hardness of the chilled tread has hitherto rendered the operation of turning them impracticable, owing to the great expense, which made it cheaper to frequently replace the worn wheels with new ones. To obviate these objections and reduce the cost of this process, we furnish a machine capable of making a perfect wheel at small expense.

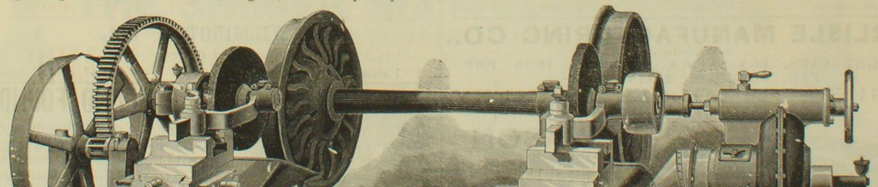
Wheels with flat places, and otherwise badly worn, that are ordinarily condemned and used for scrap iron, can be ground and fitted so as to double their original mileage. This alone makes our machine the greatest money saver ever introduced to railroads.

A sound Chilled Car Wheel trued by our method cannot be excelled by a paper or any other description of Car Wheel with steel tire.

Any person having a slight acquaintance with tools may, after five hours' instruction, become thoroughly competent to operate our machine.

Allowing all new wheels to be 3-32 inch oval, if properly fitted to axles, our machine *will* true up one pair an hour.

We manufacture expressly for use with our machine, Abrading Wheels, which, as the result of a series of experiments and long experience, we guarantee to be the best grinding wheels made. No odor, no glaze, and we defy competition.



Central Pacific Railroad,
Chicago & Northwestern Railway,
Chicago, Rock Island & Pacific Railway,
Virginia & Truckee Railroad,
Pennsylvania Railroad,
Denver & Rio Grande Railway,
Chicago, Milwaukee & St. Paul Railroad.
Canadian Pacific Railroad (Yale B. C.),
Chicago City R. R., Cable Road,
New York & New England Railroad,
Union Pac. Ry. (Denver & S. Park Div.),
South Pacific Coast Railroad,
Nevada County Narrow Gauge Railroad,
Chicago City Railway (South Division),
New York, Ontario & Western Railway,
Utah Cent. Railway,
Lehigh Valley Railroad,
Pullman Palace Car Company,
Allegheny Valley Railroad,
Chicago City Railway (West Division),
Carson & Colorado Railroad,
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J. Harris & Co., St. Johns, N. B.
A., T. & S. Fe Railway,
Baltimore & Ohio Railroad,
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We are prepared to sell machines outright, or to furnish them on royalty for each pair of wheels trued.

THE ALLENTOWN ROLLING MILLS, Allentown, Pa., Manufacturers and Financial Agents East of the Mississippi River.

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THE BALTIMORE CAR WHEEL COMPANY,

MANUFACTURERS OF

CHILLED WHEELS OF ALL PATTERNS AND SIZES, FOR EVERY SERVICE, AND WITH OR WITHOUT AXLES.

CAPACITY, 400 WHEELS PER DAY.

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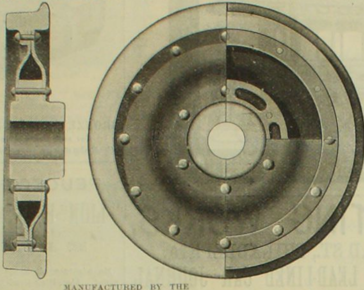
OFFICE AND WORKS Fulton Junction, Baltimore, Md.

THE THURBER STEEL WHEEL,

The special claims which we make for this wheel are:

First—Simplicity of construction.
Second—Facility and economy of repairs and renewals.
Third—An elastic reception of concussions in service.
Fourth—Durability as a result of the general excellence of the wheel



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ESTABLISHED 1833.

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Out of the Best Charcoal Iron.

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ALSO BUILD LOCOMOTIVES OF ANY DESCRIPTION.

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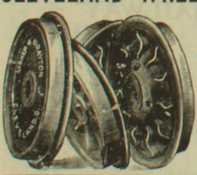

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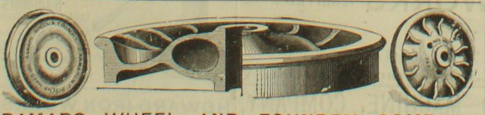

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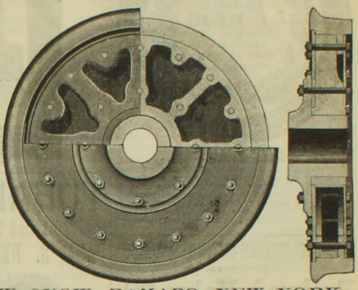

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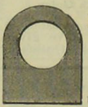

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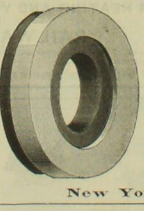

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Surpassing all other Nut-Lock Devices in

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Strengthened and Protected from Weather.
Cannot be Crushed or Burst.
Will not Lose their Elasticity, nor Rot.
Adapted for both Plain and Angle-bars

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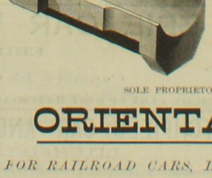

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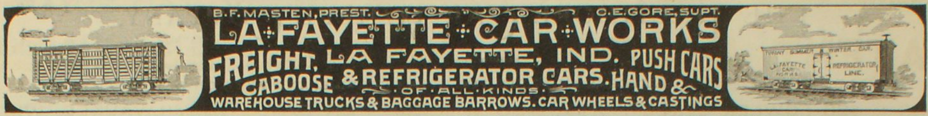

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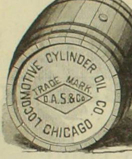

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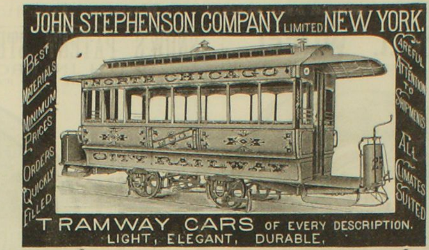

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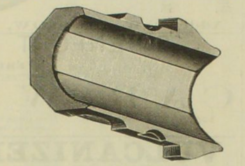
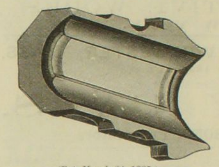


(Pat. March 24, 1885.)
Showing Chamber with Lining.



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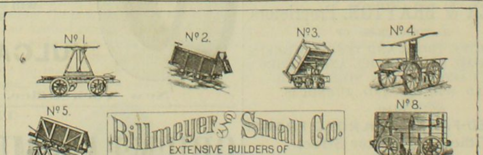

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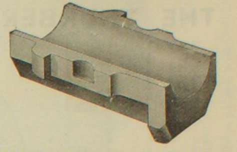

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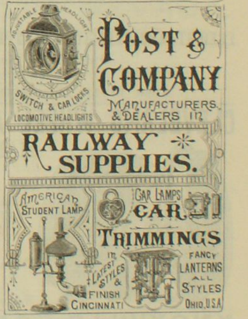

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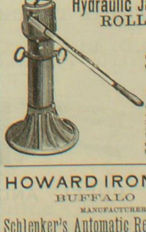

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418 to 428 FOWLER STREET, - - - - - - - - - MILWAUKEE, WIS.

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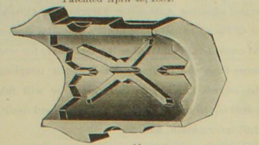

This Bronze Shell, filled with our "**NICKEL ANTI-FRICTION,**" is producing immense mileage on all railroads now using, among them the **Chicago, Milwaukee & St. Paul Railway,** who have adopted over all others, and to whom we are pleased to refer by permission.

Our "Anti-Friction" Metal is **UNSURPASSED** as a ubricator, under any pressure, slow or greatest speed.

OUR "SUPERIOR BRONZE" we warrant unsurpassed by that of any other so-called Bronze or composition Metal for bearings and miscellaneous purposes. We will furnish this metal in Castings or Ingot, as may be desired, and respectfully solicit your correspondence. We have as large a Smelting Capacity as any Foundry in Brass and Bronze in the country, and are able to **FILL ALL ORDERS PROMPTLY.**

Please request our prices (f. o. b. anywhere in United States) on Bearings, Brass and Bronze Work, Anti-Friction Metal in Pigs, etc., etc

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WE REFER TO WESTERN RAILROAD ASSOCIATION AS TO VALIDITY OF PATENTS.

Car-Builders will find it Advantageous to Communicate with Us.

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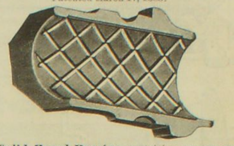
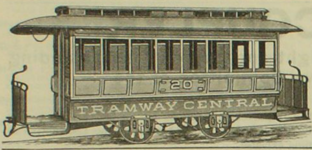


This is a **Solid Bored Bearing,** containing grooves one-eighth inch deep for free distribution of oil in starting, thereby preventing many hot journals.

The above, when made from our "Superior" Bronze, and lined with our "Nickel Anti-Friction," produces a bearing which recent severe tests have convinced our customers to be the best yet, as a prominent Railroad Manager says, "The 'gilt edged' Bearing of America, yielding in its nature and **not wearing the journal, yet resisting self-wear** better than any other Bearing I ever saw."



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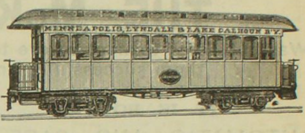

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CAPACITY, - - - - - - - - - - - - - - - 30 CARS PER DAY.

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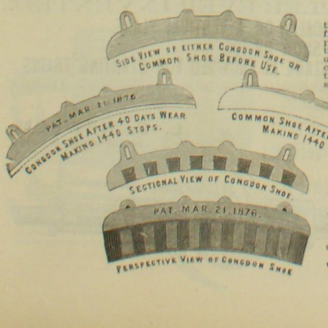

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This shoe, while being more effective, in that greater uniformity of friction can be obtained when applied to the wheels of a train in motion without stopping the revolution of any till the train is at rest, exceeds in life, or the durability of the Shoe itself, that of the cast iron shoe by over seventy-five per cent.

Its durability, together with cheapness and simplicity of construction, recommend it in preference to any other in use

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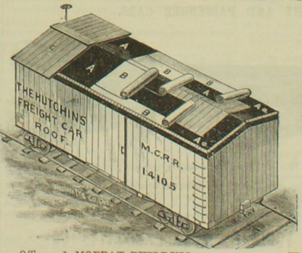

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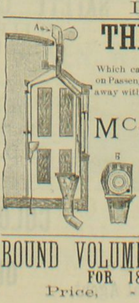

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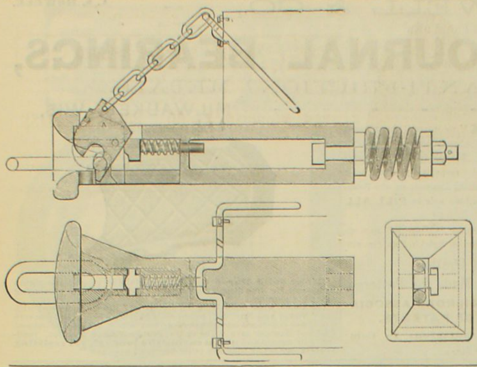

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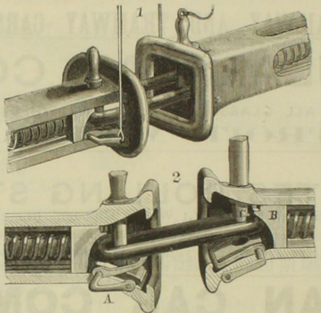

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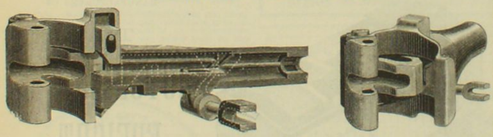

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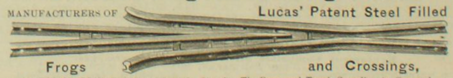

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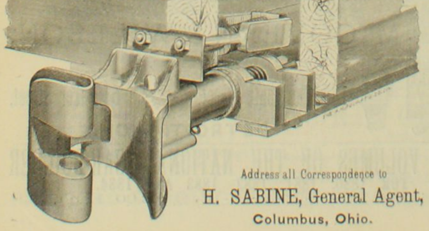

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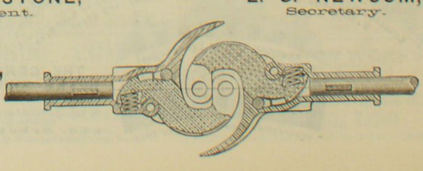

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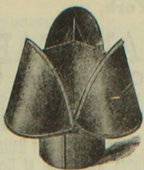

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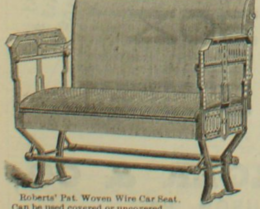

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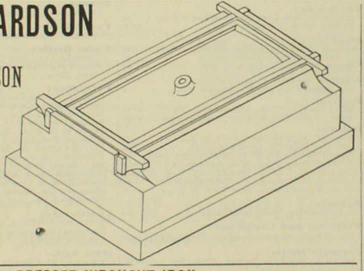

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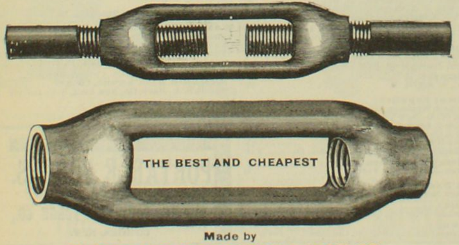

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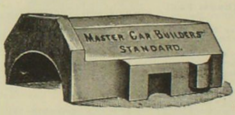
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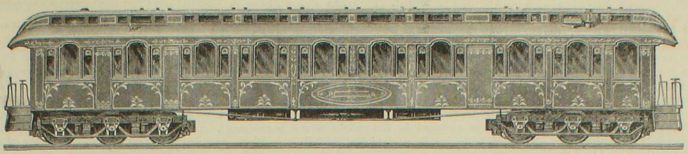


DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

VOLUME XVI. NUMBER 12. | DECEMBER, 1885. | SINGLE NUMBERS, TEN CENTS, $1.00 PER ANNUM.

Miscellaneous Items.

THE Knoxville (Tenn.) Car Wheel Co. turns out 75 wheels per day, and has lately added a department for the building of mine cars.

A NEW instruction book, explaining with great minuteness the working of and how to care for the Westinghouse automatic air brake has been issued to all the trainmen belonging to the Chicago, Burlington & Quincy Railroad system.

MR. WILLIAM WOODCOCK, Master Mechanic of the Philadelphia & Reading Railroad, at Elizabeth, N. J., is agent for the Robins interlocking brake shoe, which is highly recommended for simplicity and efficiency combined with economy.

THE Ensign Manufactaring Co., at Huntington, W. Va., are filling an order for 500 pairs of wheels on axles for the Wilmington & Weldon, and Wilmington, Columbia & Augusta roads, and are also building 200 cars for the Chesapeake, Ohio & Southwestern.

CALDWELL C. JENKINS, Philadelphia, has patented a car axle box, which has a collar that goes close up to the hub of the wheel. The object aimed at in the invention is the producing of an oil-tight, dust-excluding box. That appears to be done, but no provision is made for changing a brass on the road.

A DISPATCH from Atchison, Kansas, says that the Missouri Pacific Railway Co. have purchased ground at that place upon which they propose to build at once new shops, including foundry and car works, to cost $250,000 and employ a force of 2,000 men. A railway hospital will also be built near the shops, to cost $25,000.

GREAT activity is manifested in Germany in the improvement of steel sleepers, transverse and longitudinal, for railroads, and their use is extending, the transverse being generally preferred ; but it does not appear proven, even with European prices for wood and steel, that there is any economy in the use of the latter for the purpose.

THE British Admiralty are conducting experiments at Portsmouth, England, for the purpose of determining the exact value of liquid fuel for generating steam for the propulsion of torpedo boats. It is expected that the experiments will furnish valuable data regarding the value of petroleum compounds for use as fuel in all kinds of steam boilers.

A WELL of good lubricating oil, it is reported, has been struck near the Oregon Short Line, at a depth of 120 feet. A two-inch hole was first drilled, and it is being enlarged to six inches, and many other wells are being drilled in the district. There is said to be a rich oil belt there, which, at no distant date, is destined to become an important industry.

THE Burlington & Missouri River Railroad shops at Plattsmouth, Neb., have recently received important additions to their stock of tools. Among the most important new tools are two planers with 5-feet bed, one 19-inch slotter, one large bolt-cutter, one twist-drill grinder and a heavy steam hammer. A new scrap-iron furnace has also been built.

JACOB A. PARKER, Terre Haute, Ind., proposes to divide stock cars into compartments by means of wire netting screens held in position by movable posts. The intention is, to provide partitions that will prevent the stock from moving round, and would be a safeguard against the animals falling down and getting trampled on. The details of the plan have been patented.

THE Illinois Central Railroad has got a great many of their 20-ton coal cars equipped with 36-inch cast-iron wheels and heavy axles, with journals 4 × 7½ inches. These wheels are reputed to give very great satisfaction under the heavy service to which the cars are subjected. Before the change was made great trouble and delay was experienced through hot boxes, but now there is seldom a hot box reported.

SHOP NOTES.

Editorial Correspondence.

CHICAGO, ALTON & ST. LOUIS RAILROAD SHOPS.

The mechanical headquarters and machine shops of the Chicago, Alton & St. Louis Railroad are located at Bloomington, Ill., a town half-way between Chicago and St. Louis. This location originally placed the machine shops about the middle of the railroad system they belonged to —a very convenient arrangement—but the road has of late years stretched westward so far that Bloomington is far from the middle point ; still, it continues to be quite convenient for receiving work from the various branches.

Taken as a whole, the machine shops belonging to this road have the best facilities for handling the work they do, and are controlled by the best system of producing work and finishing it properly for the purpose it is intended that we have ever seen in a railroad shop. We have examined larger shops and establishments of less dimensions where many more workmen were employed, but we never were in a shop where the machines and tools were so perfectly adapted for the work they had to do, where the various repairing operations moved along in such a frictionless, orderly way, and where the finished material fitted the parts for which it was intended so perfectly. There is some credit due to the head that runs an establishment like clock-work where new material exclusively is turned out; but something more is due to the head that subjects the multitude of varied operations represented in repairing old locomotives and cars to a system that appears automatic in its action.

The shops are grouped in a rectangular piece of ground alongside the main line of the road, the principal buildings standing at right angles to the track, and the smaller buildings arranged conveniently between or alongside of the larger ones. The machine shop is the building most worthy of attention, and we would advise any master mechanic who is interested in seeing how work can be most economically performed, to make a pilgrimage to Bloomington prepared to remain there three days, and spend that time standing round the shop. It is a single story building 110 × 404 feet, standing clear of all other structures, and well lighted round the sides and through the roof. One side of the shop is completely devoted to building or repairing stalls, and has capacity for eighteen engines to stand over pits. Over the stalls two Yale & Towne traveling cranes, each of 45,000 pounds capacity, traverse the whole length of the shop. Each of these cranes is provided with two trolleys that work together or separately, as required. They are used in concert for lifting locomotives, and they are regularly employed for this purpose, entirely dispensing with the use of jacking. The cranes stand up so well in the building that they can carry bulky material from one end of the shop to the other without interfering with the engines standing below. All day these cranes are kept moving along, doing whatever work, in the way of lifting, that has to be done in putting together or taking apart material. Their operations are not confined to heavy weights. They sling around a boiler or frame as if it was merely a feather weight, but they are equally ready to raise up or lower a smoke-stack, a bell-frame, a cab or a running-board. Anything that a single workman cannot raise with ease the crane is called on to assist with, and one of them is always ready. A track passes across the shop about the middle, and here all material is brought in from the outside. It is distributed from that line by the cranes quietly and expeditiously, without disturbing any work within the building. Between the stalls, sufficient room is provided for erecting the frames and cylinders, with their smaller attachments. When this is done the whole is raised by a crane, placed on stocks over a pit and the boiler put on to it. While we were in the shop an order was given to take the wheels out from under an engine that had been brought in an hour or two before. The two large cranes were moved to the spot where the engine was. Heavy bars were placed across under the frames at the front and back of the engine. The trolleys were hooked to the bars, and the order was given to hoist. Up boiler and frames went, leaving wheels and truck. These were rolled out, blocks were placed over the pit, and the frame and boiler lowered upon them all within fifteen minutes. There was no fuss or shouting. All was done quietly and in a matter of fact way by three or four men.

The engines that are built or repaired in this shop are completed ready for firing up in the stall where the work has been commenced. When an engine is finished, it is run out upon the transfer table and taken to the roundhouse. If the whole shop full of engines were undergoing the finishing work at the same time, one would not interfere with the other.

All the heavy tools are ranged along the middle of the shop, and this portion is traversed by three overhead cranes, each capable of lifting five tons. It is found that three cranes are sufficient at present to do the transferring of material at this part of the shop, but Mr. Wilson, Superintendent of Motive Power, says that so soon as the work gets beyond the capacity of three cranes, another will be added, and the same plan will be followed with the other crane tracks.

On the other side of the shop, all the small tools are arranged. This portion is served by two overhead traveling cranes, each capable of raising one ton weight.

To enumerate the tools in use would be to tell the names of the best machines that have been regarded as successful in working metals. In addition to the best tools found in well regulated manufacturing establishments, there are some special tools worthy of notice and better worthy of inspection. The largest milling machine we have ever seen is here, and it is the only one of its kind in the country, for it was designed by Mr. Wilson of these shops, and built specially for the place by Wm. Bement & Co. We happened to be in the Bement Works, Philadelphia, about the time this tool was finished, and found that great interest was manifested in the machine by the engineering fraternity in that quarter. The machine is capable of taking in work 6 feet wide between the housings. The arbor carries cutters from 1 to 7 inches wide and 8 inches diameter. As specimens of work done by this tool, it mills the key-seats of six driving axles at once. It finishes the valve seats and cuts out the ports of cylinders and bores out the cylinder saddle for the smoke-box seat. It is also found to be capable of doing work very expeditiously on rods, straps, wedges, guide-yokes and many other parts of the machinery. Among small special tools used with good effect here is a set of expanding mandrels invented by Mr. John G. Pope, one of the foremen. This mandrel consists of a square threaded screw with three slots or splines milled lengthwise at equal distances apart. A tapered key fits into each spline and slides in it. The thick ends of two of the keys are set at one end of the screw, and the thick end of the other key at the opposite end. Nuts are used to advance these keys so that they wedge under work placed on the middle of the mandrel. The screw mandrel is placed between the centres of a lathe. Glands and all sorts of collars are turned very rapidly and accurately on these mandrels. The same man got out a special tool for cutting holes in flue sheets. It will cut a 2-inch hole through a ¼-inch steel sheet in three minutes.

The condition of a shop can generally be inferred from the appearance of the tool room, and the tool room here is entirely worthy of the shop. It is located at the end of the shop, is roomy, admirably lighted and has all tools, templates and gauges arranged in excellent order, every article being easy of access. No machine work is done inside the tool room. It is presided over by one man, who gives out every thing through a window, and has all the small tools, taps, dies, and reamers that are used oftenest nearest to his hand. In connection with this tool room, Mr. Wilson has a plan in view of placing annunciators in the tool room with a connecting button beside each machine tool. When anything is wanted by a workman, all he will have to do is to touch that button, and a boy will attend on him.

All new work, and a great deal of material got out for repairs, is made accurately to templates, and there are templates for every important part of the engine. The parts are not only interchangeable in name, they are interchangeable in regular practice, just as the pieces of a sewing or reaping machine are. When a driving axle box, an eccentric strap, a pump, a cross-head, piston, or any other part is needed, say in Kansas City or St. Louis, it is taken out of stock and sent to its destination, and the men in charge no more look for it failing to fit, than they expect a new head for a Westinghouse pump to need fitting. The parts are not made and fitted for any individual engine, they are *manufactured*, and the templates control the size and finish. A driving box, unless for special repairs, is not fitted to the shoes that fit certain jaws. Its sides are scraped to fit a template that represents the jaws, and another template represents the axle journal. Finished to these standards, each part is put in stock and drawn for any engine of the class it belongs to. The frames and cylinders are planed and slotted very accurately to hardened templates, and all holes are drilled through hardened bushings. This brings out the work so true, that the guides are always put up and the cross-heads and pistons put together without a line having been run through the cylinders. This is a regular practice here, but we do not know of any other shop, not even a contract shop, where it is followed.

When an engine that is not standard comes in for a general repair, all renewals are made standard, but it sometimes happens that important portions of the engine are not ready for removal while others are ; so engines are sometimes sent out partly standard and partly old. An engine of this description lately gave a very severe test to the adaptability of the interchangeable system to partly worn engines. The engine was rebuilt, but the cylinders were too good to throw away, so they were retained, and so were all the parts forward of the frame joint ahead of the main drivers. All behind that was made standard. After this engine had been running a few months, she met with an accident and had both cylinders broken. She was brought into the shop to get standard cylinders and front frames, with all their connections. These came as correctly with the back parts that had been in service for several months, as if they had been fitted together.

Another novel practice here is making the boiler and tender sheets interchangeable. A standard tender has five sheets that go completely round, and each sheet is of the same size and has the holes punched through the same template. One sheet kept finished in stock will replace any of the five sheets. If a sheet in the horn or back of the tank has to be replaced, the spare sheet can be bent to fit that place.

The working of this was very well illustrated lately in the case of a fire-box. A Jauriet water-leg had been put in this fire-box, and Mr. Wilson uses copper side sheets with that device. As the stay-bolts for copper side sheets have to be closer than where steel is used, the outside shell had to be changed. This shell was good, and was utilized to replace the worn-out shell of another fire-box, and its stray-bolt holes came true with the holes of the inside fire-box.

BURLINGTON & MISSOURI RIVER RAILROAD SHOPS.

These shops are located at Plattsmouth, Neb. The buildings that constitute the shops are ranged along a plot of ground forming a rough parallelogram, with tracks cutting it in two and partly closed in by bluffs. The buildings are mostly in the shape of segments of roundhouses, and they are set with the open part facing the tracks. We supposed that their plan of shops would be inconvenient and expensive for handling work, but Mr. D. Hawksworth, Master Mechanic, does not think so, and be believes the arrangement is particularly convenient for many purposes, and especially for car building and repairs. When a car has to be put in or taken out, no other work is disturbed by the operation, and he thinks that turn-tables give considerably less trouble in handling during the long severe winters than transfers.

A new ten-stall roundhouse has just recently been finished, and they are using it for repairing freight cars in. The house is provided with pits, but they are planked over for the present, and will be kept covered till the house is wanted for a purpose where the pits will be useful. They have also built an addition to the blacksmith shop lately, and are putting in a heavy steam hammer and furnace for working up scrap.

The machine shop is well provided with good modern tools, and several new additions have just been made, some of the new tools not being in place yet. Heavy engine repairs are being done, and one new engine is under way. A new engine is always kept in progress for the purpose of equalizing the work of the shop, and it is a very good plan. The engine now on hand is the Chicago, Burlington & Quincy Railroad standard, Class A. The cylinders are 18 × 24 inches, driving wheels 66 inches diameter, boiler 52 inches diameter at smallest ring, built with wagon top, and has 198 flues 2 inches diameter. The fire-box is 70 inches long, and the crown is secured by crown-bars and sling stays. Steel is used entirely for boiler and fire-box. They are building some new tenders with wooden frames.

They are fairly busy in the car shops, but mostly with repair work. They have a baggage car stripped to the frame and floor timbers, and one passenger coach is being thoroughly overhauled. There were fifteen other cars in the passenger car repair shop undergoing lighter repairs. Mr. Smith, the general foreman of cars, speaks highly of the convenience of the roundhouse system of shop. Among the cars in the shop was a baggage car that had run constantly between Chicago and Denver for 3½ years without being stopped long enough to be painted. They are putting the collarless journal axle, which is the Chicago, Burlington & Quincy standard, under all passenger cars as soon as a change is needed. They are also working in 42-inch Allen paper wheels under all cars where the trucks will admit of the large wheel without expensive changes. In the line of freight car work, they are changing a mongrel diamond truck to the C., B. & Q. standard as fast as trucks come in needing heavy repairs.

They have a cleanly kept small planing mill which is provided with very good tools. The sawdust and shavings are carried by pipes to the boiler-house, where all the steam required in the whole works is generated. This boiler-house is a detached building. Pipes are run from it under ground to all the shops, and steam for power and heating is supplied in this way. A separate engine is provided for each shop.

UNION PACIFIC RAILWAY SHOPS, AT OMAHA.

These shops are required to do not only the greater part of the repairing of locomotives and cars, but they are called upon to manufacture a large proportion of other mechanical appliances used on the 5,000 miles of road that constitues the Union Pacific railway system. About 1,200 men are employed at present doing the work. The shops cover a large area of ground on the bank of the Missouri river. Although the road started out as a great continental trunk line, the shops were commenced in a small way, consequently they have had to be extended piece by piece with the increase of traffic. New car shops were built lately, and they are well designed for getting out work in a business-like way, but the general machine shops are a confusion of additions. A great many of the tools are antiquated, but others are modern. On the whole, considering the way work has to be handled and the tools for working with, the mechanical department of this road deserves great credit for producing finished work at a moderate expense. Mr. Congdon, the Superintendent of Motive Power, appears to take but little interest in the details of management, probably because he is relieved of these burdens by very able assistants, in Mr. John Wilson, Assistant Superintendent of Motive Power and Mr. J. H. McConnell, Master Mechanic. The latter gentleman has charge of the shops at Omaha, and the orderly way the numerous operations under his charge are conducted, indicates a high degree of executive ability. They are quite busy with repairs in the machine shops, and have recently completed a new locomotive which will be found described elsewhere. They have a good modern tool room, well provided with, standard tools, gauges and templates. All engine work is turned out to templates. In the repair shop we observed a boring mill for cylinders being operated by a portable water motor that was run by the ordinary tank pressure It seemed to waste very little water.

A most interesting part of the machine shop is the room where the air-brake, injector, and lubricator cup work is done. The room is in charge of Mr. C. F. Stimson, a very intelligent machinist, who takes a great pride in his work, and seems to understand brakes, injectors, and oil cups thoroughly. There is a complete automatic air-brake apparatus fastened to the wall, and a pressure of air is constantly kept up to show the working of the brake. A triple valve cut in section is secured above the working triple valve, and connected to the latter by a stem which makes the two operate together. This is an admirable way of showing exactly how the triple valve works. Mr. McConnell intends taking firemen into this room, and examining them regarding their knowledge of the air-brake before they are promoted to the right-hand side. There is a large air reservoir kept here for charging the auxiliary reservoirs of passenger trains with air before they are sent to the depot. Underground pipes lead from the shop all through the portion of the yard where the passenger cars stand, and proper means of making connection are provided at convenient points. As the air has to be carried a long distance through pipes with frequent bends, a greater pressure than that supplied by the ordinary pump has to be maintained in the main reservoir. To get this extra pressure, the lower part of a pump was bushed, so that the steam end can work it quickly in compressing up to 120 pounds. An ordinary pump is used till a pressure of about 80 pounds is put on the reservoir, then the bushed pump is connected to finish, and it is kept going to maintain the pressure as air is drawn off. When the reservoirs on the cars are charged, the brakes are tested, and an inspector sees that every shoe is applied and comes off. The train is then ready to go to the depot, and all the engine has to do before starting is couple on.

Mr. A. M. Collett, Master Car-Builder, is quite busy in his department. There is no new passenger car work on hand, but the call for repairs seems unlimited. The fine new car shops are already too small for the growing work of the road, and the greater part of the freight car work is already done outside. They are building a good many freight cars, the greater part being for the narrow gauge divisions of the road. They are using Oregon fir very extensively in this work. In fact, the whole wood-work of the cars is made of that timber, except end sills and draw-bar timbers. Some of these narrow gauge cars have a capacity of 40,000 pounds. They have been putting on automatic air-brakes on ten freight cars a day ever since January last. Mr. McConnell says the engineers handle the freight trains with the air-brake, just as free from jerks and jars as passenger trains are handled.

CENTRAL IOWA RAILWAY SHOPS AT MARSHALLTOWN, IOWA.

The most notable feature about these shops is the amount of good work turned out with very inferior facilities. There are few tools and few men, yet the engines belonging to the road are in very fair condition ; all of which goes to show that the Master Mechanic, Mr. John Player, has the rare capability of making men and machines d their best as producers. The road evidently is badly smitten with the Wabash policy of trying to make machinery run without repairs. They have four engines in the shop for general repairs, and one has just been turned out with a new fire-box. There are seven Mason bogie engines on this road that are regarded as extremely unsuitable for the work they have to do. The boiler of one exploded with disastrous results a year or two ago. The engines would do very well on slow, steady pulls, but this, like most western roads, has to be operated by running fast down one hill to get up the succeeding grade. Fast running tears these engines all to pieces. They have got the Walschaert valve gear, and it is said to be much more expensive to keep in repair than a link motion.

In the car shops, they are building a new combination car, and repairing as many as the force employed can do. Mr. Player appears to have a very able set of foremen, which is no doubt the secret of his success in getting out work rapidly. Messrs. John H. Wrigley, of the machine shop ; D. B. Ramsdell, of the pattern shop ; M. Sullivan, of the roundhouse ; and A. Batty, of the car shop, are as good men for their positions as can be found anywhere.

WISCONSIN, IOWA & NEBRASKA RAILROAD.

The mechanical headquarters of this road are in Marshalltown, Iowa, but they are not of an imposing character. The road, which is known in Iowa as the Diagonal, is over 100 miles long, has eleven locomotives, and has been running going on two years, but its head shop is a roundhouse with a vise bench, a vise and grindstone representing the machinery. To help on the difficulties of taking care of the engines without tools, there are about eleven different classes and makes in the eleven engines. We do not envy Mr. M. C. Wheeler, Master Mechanic, the superfluous pleasures of life he enjoys over the business of keeping these engines running.

BURLINGTON, CEDAR RAPIDS & NORTHERN RAILWAY SHOPS.

Business is very heavy on this road at present, and most of the engines are kept on the road almost continuously, but the shops are getting out a good deal of work, a great part of it being for stock to be ready for the repairs that will be needed as soon as the engines can be got in. Five new Brooks ten-wheel engines have just been ordered. Mr. Bushnell, Master Mechanic, has recently promoted Mr. G. Y. Smith to be general foreman, and Mr. Allan McDuff to be foreman of tools and machinery. Extensive improvements are being effected on the roundhouse to prepare for the winter. Additions have been made to the length of the house inside the circle to admit of the doors being opened inside. Those who have wrestled over the difficulties of opening roundhouse doors outward during a snow-storm, will appreciate the advantage of this change, especially in a region where three blinding snow-storms a week may be expected during four months of each year. Porches have also been made to all small doors, and double sashes have been put in all the windows. Pipes have been fitted all through the house for conveying steam from the stationary boiler, or from the boiler of any engine being cooled down to the boilers of engines that are having steam raised.

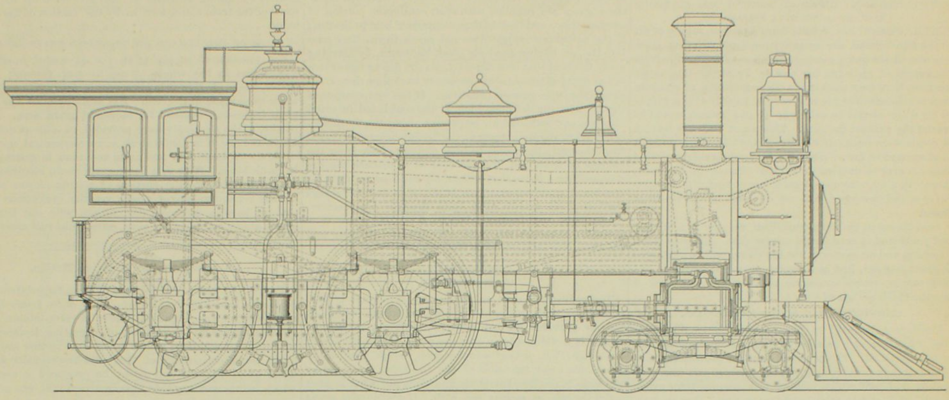
FLINT & PERE MARQUETTE SHOPS, AT EAST SAGINAW, MICH.

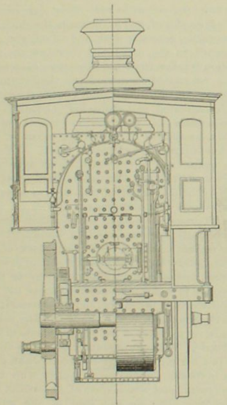
These shops are running very light at present, although they have six engines in for repairs. The shops are quite modern, and are equipped with good machinery and have an excellent tool room. Over the center of the shop is a ten-ton Yale & Towne traveling crane. All engines are fitted with extension smoke box and brick arch. Mr. Hatswell, General Master Mechanic, gives it as his opinion that the extension front without the brick arch is a failure. The extensions are fitted with an emptying valve controlled from the cab. This valve is an enlarged plug valve. This is used either when the engine is running or standing, and it is found that in the former case no trouble arises from the entrance of air when the valve is open, or of the sparks refusing to be emptied. A finer netting than usual is employed. On the northern divisions, snow gave considerable trouble by filling up ash-pans, and, as a remedy, Mr. Hatswell raised the boilers some 6 or 8 inches. He finds that engines ride much easier in consequence of this change, and the ash-pan is raised above the snow.

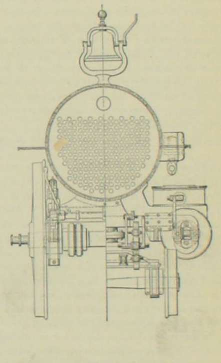
A COMPANY has been formed in Elgin, Ill., for the purpose of constructing a series of street railways in the city, to be operated by electricity. The report has been made that the road can be built and equipped for $5,000 per mile. The length of track projected is five miles. No estimate is given of what the cost of operating by electricity will be.

IT is reported that the Baltimore & Ohio Railroad Co. will erect large machine shops next Spring at Wheeling, W. Va.

STANDARD PASSENGER LOCOMOTIVE (CLASS A.) NEW YORK CENTRAL & HUDSON RIVER RAILROAD.







The locomotive shown in our engravings is class A standard passenger engine of the New York Central & Hudson River Railroad. The engine is the most advanced development of Mr. Buchanan's designs, and may be regarded as a typical American eight-wheel, high-speed locomotive, designed for burning bituminous coal. Engines of this class are employed in running all the fastest trains on the railroad they belong to, and they perform the work as efficiently and economically as any class of locomotives on the American continent.

The engine has cylinders 17 × 24 inches, and the driving wheels are 70 inches diameter outside of tires, the tires being 3½ inches diameter. The boiler is designed to carry steam at 145 pounds pressure. With a mean effective pressure of 120 pounds, the engine is capable of exerting a force of 11,890 pounds to turn the drivers. As the total weight of the engine in working order is 82,760 pounds, and as 52,160 pounds rest on the driving wheels, the whole force stated may be used in starting a train without trouble from slipping.

Throughout the whole of the parts of engine and boilers indications are everywhere apparent of well-considered designing and painstaking development of details. Ample wearing surface is provided for all the rubbing parts. A liberal margin of strength is given to all parts subjected to working strains, yet the material is judiciously placed to secure as much lightness as possible consistent with the required strength, and all parts are put together in such a way that they can easily be taken apart for repairs, or reached when repairs are necessary. This is a very important feature, and one that has very great influence on the cost of repairs when an engine is in service; and it is also a matter which is too often neglected by locomotive designers.

The valve motion is of the ordinary shifting-link type, and it is designed so that the distribution of steam is remarkably uniform from full stroke up to 6 inches cut-off. The steam ports are 1¼ × 15½ inches, and the exhaust port is 2½ inches wide. The valves have ⅞ outside and 3/32 inch inside lap, set with 1/16 lead in full gear, and the greatest valve travel is 5 inches, being equal to the throw of eccentric. The main connecting rod is 7 feet 9 inches long, the length of the eccentric rods is 47⅝ inches, and the links are slotted to a radius of 63⅝ inches. Strap ends are used on connecting and side rods. A plain steel cross-head working in four-bar guides is employed. The centers of the cylinders are 6 feet 1 inch apart, and the driving wheels tram 8 feet 6 inches between axle centres, that length of side rods being required. The driving axle journals are 7 inches diameter and 8 inches long, the main crank-pin bearings are 4 × 4 inches, and the side rod bearings 3¼ × 3¼ inches.

But the most noteworthy parts of this locomotive are the boiler and fire-box. This combination of boiler and fire-box can hardly be regarded as a novelty, for the pattern has been in use for several years, but its features and performance are not nearly so well-known as they deserve to be. The boiler is of the wagon-top variety, being 50 inches diameter at the smallest ring, and the wagon top is raised 11 inches. Iron ⅝ inch thick is used throughout the shell, the horizontal seams have a single lap welt and are double riveted, and the circumferential seams have single lap, single riveted. There are 198 steel tubes 2 inches diameter and 11 feet 8 inches long.

The inside fire-box is of steel, the side, front and back sheets being 5/16 inch thick, the crown sheet ⅜ inch thick, and the tube plates ½ inch thick. Beginning at a point in the front sheet of the fire-box, level with the bottom of the barrel of the boiler, a water table passes diagonally across the fire-box to a point above the fire-box door, dividing the fire-box into two parts. The only communication between the part of the fire-box where the grates are, and the part connecting with the tubes, is an oval opening resembling an ordinary fire-door, which is made in the middle of the water table. Through this opening, all the gases of combustion must pass in their way to the tubes, and the upper portion of the fire-box acts as a combustion chamber to complete the chemical combination of the products of the fire. This arrangement in itself is a good smoke preventing device, for it tends to promote the admixture of the gases which results in the perfect combustion that produces no smoke, but Mr. Buchanan has added special means for supplying air above the fire, which makes this fire-box phenomenal for the manner in which it burns the softest bituminous coal without producing smoke. Superheated steam is used to induce jets of air upon the fire through four openings made in the front and four in the back of the fire-box. Steam is led from the dome through an iron pipe which passes inside the fire-box to a coil which rests on top of the water table. Here the steam is superheated and afterward passes on to the jets mentioned. These jets act as air injectors, and propel a considerable volume of air into the fire-box, imparting to it a portion of the heat of the superheated steam, thereby tending to keep up the temperature of the fire-box.

The crown sheet is stayed with girder stays. There are 18 square feet of grate area, the heating surface of the fire-box is 153.12 square feet, heating surface of tubes 1,200 square feet, the total heating surface being 1,353.12 square feet.

The engine has an extended front-end and open stack, this, in combination with the style of fire-box, providing a thorough preventive against spark throwing. The base of the smoke stack is conical, and the exhaust pipes are brought up and come together gradually, ending in a single nozzle 4½ inches diameter. Mr. Buchanan believes that the single nozzle exhausting the steam centrally into a conical shaped stack, acts like an ejector in inducing draft, and that the required draft can be maintained in this way with a comparatively low speed of exhaust steam, which means light back pressure in the cylinders.

Some time ago we made a trip in the cab of one of these engines from New York to Albany, when she was pulling the Chicago limited express train. The train consisted of seven cars, weighing empty about 150 tons, and not less than 175 tons with passengers, baggage and express. The run was made at an average speed of 36 miles an hour. The coal on the tender was of a soft, crumbly kind, and was badly slacked, so much so, that the greater part would have passed through netting with one-inch meshes. Most engineers starting out with ordinary engines to burn such coal, would have anticipated bad trouble for want of steam; but there was no lack of steam in this case, for the engine ran 60 miles without stopping, and the fire-door was kept partly open most of the time. During the whole of the trip we paid very close attention to the firing, and watched closely for the appearance of sparks or smoke. In passing through the tunnels and bridges we could see no sparks thrown, and on returning at night when the locomotive was making up time and was hammering along at the rate of 60 miles an hour, all the fire that passed through the stack was an occasional spark that went high into the air and came down black. As a smoke preventer, the engine was as nearly perfect as anything could be desired. The fireman generally threw in two or three shovelfuls of coal at a firing and kept the fire level at a uniform depth. When he scattered in the coal, a black jet would shoot out of the stack, but it cleared up in an instant. The same thing happened when he raked the fire. In the cloud of steam left by the engine, no smoke was visible, and an ordinary onlooker would have concluded that the engine was burning anthracite coal.

Combustion in Locomotive Fire-Boxes.

BY ANGUS SINCLAIR.

Fourth Article.

DIFFICULTIES ENCOUNTERED IN BURNING COAL ECONOMICALLY IN LOCOMOTIVE FIRE-BOXES.

While waste of heat results from a profuse supply of air to the fire, beyond the quantity required to effect combination of the gases, much greater loss of heat arises from the supply of air being too small. To strike the happy medium is no easy matter, for the conditions of combustion in a locomotive fire-box vary so rapidly that a supply of air which would be sufficient at one minute would be wastefully profuse the next. This is not the only feature of combustion in locomotive fire-boxes where it is difficult to steer clear of loss. With the best appliances provided that can ever be devised to aid the fireman in his work, there will always be considerable loss of heat, but thoughtful care and developed skill will do much to restrain these losses.

Coal placed in the most unskillful manner in a fire-box badly adapted to economical combustion, will burn after a fashion and make steam, but the steam will be generated at great expense, just as it proves very expensive in the long run to operate an engine that is badly quartered or has the cylinders out of line.

ANTHRACITE COAL BURNING FIRE-BOXES.

Fire-boxes designed to burn anthracite coal perform their functions, as a rule, better than those intended for bituminous coal. The principal cause of the difference is, that anthracite coal is nearly pure carbon, and the phenomenon of combustion is much less complex than where much hydro-carbon compounds are present. Less air is required to effect complete combustion, and the fire does not form so compactly as in the case of bituminous coal, and the air that passes through the grates mixes freely through the whole body of the fuel, providing the means of perfect chemical combination. The line of improvement likely to be followed in the designing of anthracite coal burning locomotive fire-boxes, is the providing of ample grate area, so that the quantity of coal to be consumed per foot of area shall at no time be excessive. Several forms of hard coal burning fire-boxes already leave little to be desired in the way of improvement.

THE PROBLEM OF BURNING BITUMINOUS COAL ECONOMICALLY.

Anthracite coal burning engines form a small proportion of American locomotives, and it is continually growing smaller. The soft coal burner is no doubt the locomotive of the future, and the achievement of burning bituminous coal economically, and without an objectionable quantity of smoke, is a problem of growing importance, and one that no American master mechanic can afford to ignore, although many do so. In searching for the most economical conditions adapted for the combustion of bituminous coal in locomotive fire-boxes, we have to consider the character of the coal, the way it is handled in feeding to the fire, the size of the grate in relation to the heating surface, the means of admitting and controlling air, and the influence exerted on the fire by the draft appliances.

HEAT VALUE OF THE GAS PRESENT IN BITUMINOUS COAL.

The bituminous coal used as fuel for locomotives contains from 4,000 to 9,000 cubic feet of carbureted hydrogen gas to the ton. The quantity of gas varies according to the quality of the coal, but 6,000 cubic feet to the ton may be taken as a fair average. This gas has nearly double the calorific value of the same weight of pure carbon, yet through the defects of fire-box construction and errors of firing, most of the volatile gases pass away without producing heat, and are known only to the world through their aggressive attributes as smoke producers. Every pound of coal thrown into the fire-box produces about two cubic feet of carbureted hydrogen. When this gas is liberated from the pound of coal it leaves, when impurities are deducted, only about .7 of a pound of carbon in the form of available solid fuel. Were the whole of this carbon now to be utilized in steam making, we find there would only be 10,150 thermal units available instead of 14,500 units in a whole pound of carbon. But the two cubic feet of carbureted hydrogen weigh about .12 of a pound, and when this enters fully into combination with oxygen, it generates 3,240 heat units, which serve materially to increase the fire-box temperature. From these figures, it will be seen that the volatile gases constitute nearly one-third of the heat value of ordinary bituminous coal. A fire-box that provides the means of burning all the gases in bituminous coal will show the thermal value of the latter to be nearly equal to the best anthracite. The way to do this is to provide the proper means of mixing air with the gas as it is liberated from the coal, maintaining in the meantime a fire-box temperature away above the igniting point.

HOW HEAT MAY BE SAVED OR WASTED.

When bituminous coal is used for fuel, the fire-box of a locomotive acts as a retort for distilling the gases, and it is to some extent the fault of construction if the gases are not made available for steam raising; and when they are not turned to useful account in this way, their presence in the coal is an actual injury, for good heat has to be wasted in the mechanical work of tearing them from the solid to the gaseous condition. When a shovelful of coal is thrown into the fire-box, the immediate effect of the charge is to chill the fire, for part of the heat of the incandescent fuel, previously on the grates is used raising the fresh coal to the temperature of ignition. When that point is reached, the hydro-carbon gases are liberated. If, at the moment of release, or before they reach the tubes, these gases are supplied with their combining portion of oxygen, they yield their high percentage of heat to the fire; if the necessary oxygen does not reach them, they pass into the air, having done no good, but harm, by carrying away the heat that was drawn from the fire to raise them to the point of temperature necessary to change them from the solid to the gaseous condition. If the temperature of the fire-box is maintained high, if the coal is fed in small charges, and sufficient air be present above the incandescent fuel to supply oxygen to the hydro-carbons liberated from the coal, there will be little chilling effect from the charges of fresh coal, for the coal as it reaches the fire will produce a flame that will supply the heat required for continued gasification. This is the principal advantage derived from maintaining high fire-box temperature, firing light and from getting good air in where it is needed. It makes the difference between wasting and saving an important part of the fuel.

OPERATIONS OF THE COMBUSTION OF SOFT COAL IN A LOCOMOTIVE FIRE-BOX.

The ordinary American locomotive fire-box is a plain oblong box with grates at the bottom through which all the air provided for combustion must pass. When the engine is working a train over the road, a body of burning coal, eight, ten, or twelve inches deep, is kept covering the grates, the exact thickness of the fire being regulated by the taste of the fireman or his knowledge of what kind of a fire the engine steams best with. If the nozzles are as small as most engineers like to have them, or the grate openings are wide, the engine will steam best with a heavy fire. As the air passes through the grates, where a heavy fire is habitually carried, the lower portion of the burning mass of fire catches the oxygen contained in the air, and the atoms of carbon that succeed in getting their full share, which is two atoms each, pass upward in the form of carbonic acid gas, the most efficient heat-producing result of combustion. Farther up in the burning mass are atoms of carbon that have been raised to a high temperature and are whirling ready to grasp their share of oxygen. As the demand at this point is often less than the supply of oxygen, some of the carbon atoms succeed in getting only one atom of oxygen, but they take that and pass on as carbonic oxide. One pound of carbon combined with 2⅔ pounds or two atoms of oxygen to one of casbon to form carbonic acid, generates 14,500 heat units; one pound of carbon combined with 1⅓ pounds or one atom of oxygen to one of carbon to form carbonic oxide, generates 4,500 heat units. It will, therefore, be seen that it is not desirable to have the fuel products turned into carbonic oxide. On the top of the fire is a mass of green coal from which the carbureted hydrogen is being liberated. While one pound of carbon requires 2⅔ pounds of oxygen for the chemical combination of combustion, one pound of hydrogen requires 8 pounds of oxygen. In our fire-box, the compound that requires the most liberal supply of oxygen to make it of any use, is distilled at a point where the only oxygen to be had is polluted with all the gases that emanated from the lower part of the fire, or passed through the incandescent mass. And it requires ten cubic feet of atmospheric air to supply the oxygen needed for each cubic foot of carbureted hydrogen liberated from the coal, making twenty cubic feet of air for every pound of coal burned. Under these circumstances it is not surprising that the carbureted hydrogen passes into the tubes unconsumed. Sometimes it seizes one of the atoms of oxygen that went to form carbonic acid, for oxygen has a strong affinity for hydrogen at high temperatures, and one of its atoms readily deserts carbonic acid for hydrogen, leaving the former to pass to the tubes in the shape of carbonic oxide, a repeating cause of wasting heat.

When attempts are made to provide sufficient air at the top of a deep fire by forcing it more rapidly through the grates, the ordinary effect is to increase the intensity of combustion in the lower layers of the fire without doing any good above. Locomotives operated in this fashion always smoke like coke ovens, and no pains are taken to direct attention to their record as fuel users.

DIFFICULTIES OF FIRING THIN ON LARGE GRATES.

When a locomotive has ample heating surface when the draft appliances and grates are so regulated that an engine will steam freely with a light fire, say six or eight inches deep, the air may be passed through grates fairly well to supply the volatile gases on top of the fire with oxygen. Very few locomotives, however, with a plain fire-box will steam with a very thin fire unless they be running light trains. Where a light fire is successfully carried, great skill is necessary in firing. The coal must be supplied at frequent intervals and scattered evenly over the portions that the trained eye knows to be thinnest. There is danger of serious loss of heat resulting from thin firing just as much as the loss due to heavy firing. The grate area of fire-boxes is becoming so large that it is a difficult matter covering every part evenly, and spots are apt to get so thin that they admit cold air that reduces part of the gases below the point of ignition, so they not only pass away unconsumed, but chill every point they strike. To effect perfect combustion, uniformly high fire-box temperature is essential, and this high temperature is not easily maintained in all parts of a large fire-box when every portion of the grate is being continually assailed by strong currents of cold air forced up by the speed of the train and drawn in by the suction of the exhaust.

CAUSE OF THE DEMAND FOR INCREASED GRATE AREA

The practice of supplying all the air needed to effect combustion in the whole of the fire-box through the grates, has made thin firing essential if fairly economical use is to be made of the coal. The same practice has led to an increasing demand for increased grate area. If a portion of the air supply were provided in a proper way above the fire, it is doubtful if more economical results could not be secured by less grate area than is getting to be fashionable. With very large grate areas, intensity of heat is sacrificed for the purpose of getting slower combustion per square foot of grate; yet the indications are that for burning soft coal the engines with the largest grates are by no means the most economical fuel users.

A New Locomotive Valve Motion.

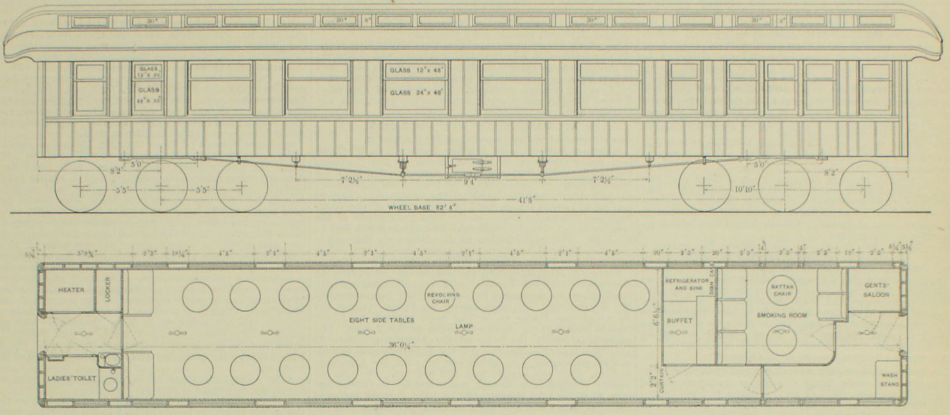
For many years, Mr. William Wilson, Superintendent of Motive Power of the Chicago, Alton & St. Louis Railroad, who is an accomplished expert on valve-motion, has been striving to find a method of operating locomotive valves that would be as simple as the link motion and yet avoid the shortcomings of that well-known valve-gear. After great thought and labor, he produced a motion which he has now applied to locomotive No. 24, one of the passenger engines belonging to the road.

The new motion is of the radial gear type, but the ellipse that forms the valve motion curve is in this instance taken entirely from the eccentric rod. Only one eccentric on each side is employed, and in the main the device consists of the eccentric, reversing gear, and an upright actuating rod attached to the rock shaft operating the valve rod. The motion is taken from the eccentric, to which is attached a fulcrumed eccentric lever, the fulcrumed bearings passing over or through guides in the reversing shaft, which is supported on a radius bar to equalize or correct the inequalities of the motion caused by the up and down movement of the driving-boxes in the pedestals while running over uneven track. This shaft is held in boxes, and is connected by an arm to the reverse lever in the cab, and can be partly rotated in its bearings by the movement of the reverse lever. While the reverse lever is in mid-gear the guides on this shaft stand in a horizontal position, and therefore the fulcrum of the eccentric lever travels in a horizontal direction. Any movement of the reverse lever, back or forward, throws the guides on the reversing shaft out of its horizontal position, and at an angle either one way or the other. The direction in which it is thrown controls the direction of the movement of the engine, and the amount it is thrown controls the amount of steam admitted. The rear end of eccentric lever partakes of and has the identical motion of the eccentric. While its forward end,—while its fulcrum travels in a horizontal direction,—describes an oval whose greatest horizontal diameter corresponds with the throw of the eccentric, and whose vertical, or smallest diameter, must be twice the lap and lead of the valve. The mid-gear notch on the quadrant always holds the guides on reversing the shaft in its horizontal position, and, therefore, the travel of the valve and the power of the engine are at its minimum. The increase of power is accomplished by simply turning the shaft, which gives a corresponding angle to the guides on the reversing shaft. When the piston of the locomotive, or engine, is at its zero point—on dead-center—an imaginary line passing through the center of the eccentric lever fulcrum would also pass through the center of the reversing shaft. Therefore, any movement of the reversing shaft on its axis would not stir the eccentric lever. By this means a constant lead is maintained, no matter where may be the point of the cut-off. In fact, the reverse lever may be moved from its extreme forward motion position to its extreme backward motion position, without moving the valve.

The special merits claimed for the motion are quick port opening and closing, thereby getting the steam into the cylinder at the begining of the stroke without wire-drawing; a constant lead, a correct and equal cut-off exhaust opening and exhaust closure, and protracted release while cutting off early.

The engine with this motion is running passenger trains between Chicago and Bloomington, and the engineer speaks highly of the easy way the engine handles the heavy trains, compared to others of the same size equipped with the link motion.

The elevated railroads of New York have had considerable trouble to prevent the water from the cylinder cocks of their locomotives from running down into the street, to the annoyance of pedestrians. To stop this source of annoyance, Mr. John D. Campbell, general foreman of the Elevated Railroad shops, connected the cylinder cocks by pipes to the smoke-box, and he has now patented a combination of cylinder saddle, smoke-box and waste-water reservoir.



NEW BUFFET PARLOR CAR OF THE BALTIMORE & OHIO RAILROAD.

THE engravings represent a side elevation and floor plan of a new parlor car (544) called the "Brandywine," recently built at the Mount Clare shops of the Baltimore & Ohio Railroad, the principal dimensions of which are as follows:

Length over Janney couplings	65 ft. 0 in.
Length over end sills	58 " 0 "
Length inside of end sills	57 " 2¼ "
Width over side sills	9 " 6 "
Width inside of side sills	8 " 8¼ "
Wheel base	52 " 6 "

The car is mounted on six-wheel trucks with 42-inch Allen paper wheels and outside bearings, and is equipped with Westinghouse automatic brake and Janney-Miller combination coupler. The lettering and numbering of the car is in the antique style, and the scroll-work in gold gives a very pleasing effect.

The interior is finished in mahogany, decorated with marquetry and fine mahogany veneer. The ceiling is oak, handsomely decorated with antique scroll-work. The general color of the upholstery is gendarme blue, with the exception of the window curtains, which are made of olive cloth. The car throughout is covered with a handsome Wilton carpet, the color and figure of which match the finish and balance of upholstery very nicely.

At the ladies' end of the car is the ladies' saloon, with Howard water-closet, supplied by tank in deck, and washstand with Knoxville marble slab. Opposite this is the Baker heater room and linen closet. The parlor of car is supplied with 19 luxurious revolving chairs and loose rattan chairs. At the end of this room on either side against partition, is a short sofa, which can be extended to meet the chair next to it, and the whole conformed into a bed, for the use of invalids, and which can be enclosed by blue corduroy curtains hung on a silver rod.

The parlor has five windows, 48 inches wide, on each side, the sash of which are hung with springs. A heavy silver rod is placed in front of each of these windows for the protection of passengers, and over each window is a silk plush lambrequin, trimmed in silk fringe, as are also the draped curtains at the end of parlor in front of buffet. This room is lighted by five Howard double-burner lamps.

The buffet is of carved finish, and is arranged with all modern conveniences. It is supplied with an Adams & Westlake urn for making tea, coffee or chocolate.

The smoking room is finished in the same style as the parlor, and is provided with five high-back seats and two loose rattan chairs, and altogether is very inviting. The gentleman's saloon is supplied with Howard closet with double lid, and opposite this is the washstand, with all conveniences.

The car is supplied with annunciator connecting with wires running throughout the car, and ventilation is amply provided for by the use of the Creamer automatic ventilator. It was constructed under the supervision of Mr. E. W. Grieves, the Master Car-Builder of the Mount Clare shops.

The Competitive Tests of Freight Car Brakes.

The Eames Vacuum Brake Co. recently addressed the following inquiries to Mr. G. W. Rhodes, chairman of the Master Car-Builders' committee in reference to the proposed brake tests to be made Dec. 14, 1885, and May 14, 1886, as set forth in the circular of the committee published in our last issue:

"As you are aware, the brakes manufactured by this company are operated by an ejector which is placed upon the locomotive. Without this ejector the brakes are inoperative. Suppose this company should furnish 50 cars according to the terms of your circular, am I to understand that after the test of Dec. 14 these cars will be kept together, and used with engines fitted with our ejector, or is it meant by the words, 'the brakes will be put into general service,' that the cars will be separated and used in the general freight service of the road irrespective of the fact that they require to be used with properly equipped engines? Of course, if the latter be meant, our brakes would be simply out of service from the time the cars left the engine fitted to operate them, until they were called in for the trial test in May next. It is obvious that such a proceeding would furnish no information in respect to the working of our brake, or the cost of its maintenance, in actual, continuous and regular service during the six months. With 50 cars fitted with its equipment, this company believes itself able to demonstrate that the brake it manufactures is as quick, reliable and effective as any in stopping trains; that its release is instantaneous, and its cost of operation (particularly respecting the use of steam and the consequent fuel, and the use of oil) and its cost of maintenance (in regard to repairs and replacements) are substantially less than with any other equally effective brake.

"This company also believes that a proper trial will demonstrate that its brake possesses many what I might call negative qualities, which are of exceeding importance; as for instance, that it will not require drainage; will not freeze; will not stick on, involving an unnecessary expenditure and waste of power in dragging the brakes and injuring the wheels by sliding. Other advantages which the limits of this letter will not permit me to state are claimed for the Eames brake.

"It is evident that these advantages can be satisfactorily demonstrated only by regular and continuous service, and my object in writing you is to ascertain whether this is contemplated by the terms of your circular.

"It is perhaps rather early to make a suggestion which savors so much of detail thus early in your proceedings, but it seems to us that the amount of fuel consumed in the operation of the respective brakes is a question the importance of which cannot be overlooked. It is a distinct claim of ours that the use of a pump to maintain a high degree of pressure throughout a long train involves a very considerable expense of fuel—amount to an appreciable and substantial percentage of the total consumption of the engine—as compared with the use of our ejector, and we submit that this question should be prominently and effectively treated in your tests. The same thing is true, though in a very much less degree, of oil. We respectfully suggest that these matters should have the consideration to which they are entitled."

To this communication, Mr. Rhodes replied as follows:

"As to whether the automatic freight car brake test contemplates the constant use of the brakes during the time intervening between the December and May trials, the Committee does contemplate this in so far as it is practicable. They also fully realize that some devices may present themselves with which this requirement would be quite impracticable without going to very great expense, an expense quite beyond the means of the Committee, and probably even the means of any brake company. Your case would likely be one in point. I do not see how the Committee can arrange to keep the brakes you describe in constant service on the lines of the Chicago, Burlington & Quincy Co. In case you wish to enter the test, however, the Committee, no doubt, would consider your admission to the December test, and owing to the peculiar construction of your device, might consider allowing your company to obtain the service required on some line where it would be practicable to get it and still come into the May test. This question, however, is one that would have to be laid before the Committee in case your company should desire to compete.

"The question would naturally arise as to whether such a concession would be doing justice to other competitors who might not have the same excuse for not leaving their cars in service on the lines of the railroad company above named."

The reply of Mr. Rhodes elicited the following response from the Eames Vacuum Brake Co.:

"We do not understand what you refer to as peculiar to our brake which renders the continuous use of our cars during the six months intervening between the December and May tests impracticable or expensive. Our position in the matter is precisely the same as the position of the Westinghouse brake, if it should enter the competition. The only difference between the two brakes, so far as this question is concerned, is that one is operated by an air-pump, the other by an ejector. The Westinghouse train brakes are inoperative when disconnected from the pump. The Eames brakes, in like manner, are inoperative when disconnected from the ejector. No test can be made of either brake unless the cars are used with engines fitted with the necessary apparatus to operate it. There is therefore, in this respect, nothing peculiar nor exceptional in our case; nothing to distinguish it from the case of any brake which is operated by whatever device upon the engine.

"If your circular contemplated only the tests of December and May, we should unhesitatingly enter the lists. But it goes farther than this. It provides that the brakes shall be put 'into general service, receiving only ordinary repairs, a careful record of the cost of which will be kept.' Of course, this means that your Committee is to report upon the continuous service and cost of maintenance of each. It would be impossible to report upon the service and cost of the Eames brake during the six months unless it was in use during the time, and it cannot be in use if the cars are to be separated from engines equipped to operate them. The same reasoning applies to the Westinghouse brake, and if your position in respect to that brake is the same as in respect to the Eames brake, your tests will necessarily be silent as regards the two brakes which will unquestionably play important parts whenever a decisive and thorough examination of the question of freight brakes is made.

"If, therefore, the general working and expense of the brake during six months is to be considered a part of the test, we submit that it is only fair and reasonable to require your Committee to guarantee that the brakes shall be used in such a manner as shall exhibit its performance in both respects.

"So far from taking this position, you suggest that even if we obtained the service we require upon some other road, the question would arise whether this would be justice to other competitors who had not the same excuse for not leaving their cars in service upon the lines of the Chicago, Burlington & Quincy. This seems to us to amount substantially to the statement that we not only cannot be guaranteed, but that we cannot expect the very trial which the terms of your circular describe, either upon the road named or anywhere else. It seems to shut out as effectually as the compression brakes are shut out by your elimination of driver brakes from the permitted apparatus. It as effectually shuts out the Westinghouse brake, if the same ground is taken in respect to it, and practically leaves the field of competition to the hand brake. Probably, this is not what your Committee intends, but it seems to be the logical result of its position."

Master Car-Builders' Club.

The second meeting for the season was held at the rooms of the Club, 113 Liberty street, New York, on Thursday evening, Nov. 19. Mr. C. E. Garey occupied the chair.

HEATING AND VENTILATING PASSENGER CARS.

Mr. W. C. Baker said that in the heating of cars we must take things as they are, not as we would like to have them A heater must be built for the cars, and not the cars for the heater. The great difficulty is to practically warm the car at every point, and the one point where heat is wanted is in the strata of air near the car floor. To keep the heat down there permanently, and at the same time away from the heads of passengers, is the great thing to be desired. The inevitable tendency of air, whether heated or not, is to rise from the cold floor. The very vibration of the car in motion is against any air remaining stationary, hence the necessity of having a radiation so positive that no current or condition can in any way influence it. In summer, ventilation is easily accomplished by constantly changing foul air for fresh through open windows, etc. In winter we must rely wholly on some purely artificial process to warm the air that is to ventilate. Cold air would ventilate as well as warm were it not that persons want to be warm rather than cold. Hence no ventilation can be practically effected, except by means of warm air.

Mr. Garey: Why do you use a coil in your heaters instead of a riveted boiler?

Mr. Baker: In a riveted boiler we get more surface in contact with the fire than we do in a coil. A coil surrounded by fire is found superior for generating or diffusing heat, to any other device in point of economy. But the great point, and the point in which almost any other form is inadmissible, is safety. It is well known that boilers are liable to burst from the freezing of the water. Of course, where salt water is employed, as it is in some cases, the danger is reduced.

Mr. Garey: Is it practicable to heat cars by hot air? If not, why not?

Mr. Baker: I do not consider it practicable to heat cars by hot air alone. It has not been done, so far as I am aware, successfully. There have been attempts by using a couple of hot-air furnaces. The fresh air was supplied from the outside by an arrangement that worked fairly well when the car was in motion and the wind favorable, but not till then would the air come up through the little holes that opened in the flue along the base. The flue would soon get full of soot. The current of air depended upon the motion of the car.

Mr. Garey: What are the advantages of the Baker heater over other types of the kind?

Mr. Baker: The idea is simply to hold the heat where it is wanted. A system of pipes run around the car and radiate the heat over the seating space. The consumption of fuel is less than that of some other systems of heating.

Mr. W. G. Creamer : My theory of ventilation is to take the outside air into the car and get the inside air out. All the devices that I have ever seen for heating cars provided for the taking of the air in at the top of the car. My theory is to take the sash and blinds out of the window behind the stove and insert in the opening an injector. This is hinged and projects about three inches from the side of the car, with its mouth toward the engine. Attached to the injector is a wire netting intended to catch all particles that may be in the air. The air is driven in through this netting into the car, around the stove, and then distributed about the car. When the cars are running in the opposite direction this injector is pulled against the car into place and the one on the other end is opened by the brakeman and works as described.

Mr. Baker: Would the car be properly warmed if it was going a mile a minute and the wind blowing 50 miles an hour against it?

Mr. Creamer: There is practically no difficulty of this kind. I do not think we often find such conditions. The stove is so constructed that the heat is thrown out into the car. When the car is standing still the ventilation is the same as that of a room. This system is also aided by my exhaust ventilation.

Mr. Baker: One feature of that system has proven a failure. It depends on the brakeman or some one to adjust the injector every time the car reverses its motion.

Mr. Creamer: I don't imagine there will be any serious difficulty of this kind. I can arrange the injector so that it will be automatic, and when the direction of the cars is changed it will change itself. The handles that operate it are close to the stove, and I think the man who knows enough to make the fire, will know enough to adjust the ventilators.

Mr. Garey : Do you use one or two heaters?

Mr. Creamer : I employ one in each end of the car. The heater could be made large enough so that one would answer the purpose, but I think it is better to have two.

Mr Garey : About how much coal does it take to run one heater, say 24 hours?

Mr. Creamer : Probably about a couple of scuttles full. I suppose it would not take any more than an ordinary stove.

Mr. Baker : How do you hold the heat on the floor of the car?

Mr. Creamer : It cannot be done. Hot air will rise, and when the car is standing still the effect is just the same as with any other stove.

Mr. Baker, in reply to a question, said his heaters were in practical use on 90 cars on the Brooklyn Elevated road. The stove stands in one corner of the car inclosed in a cabinet. It occupies simply one section. Under the stove, in the centre, is a 12-inch hole down through the floor opening under the car. When the car is not in motion, the natural current of air comes in, travels nearly the whole length of the car, and when it is in motion, the current is somewhat accelerated.

Mr. Owens : I represent the Smith & Owens heater, of Detroit. We have a device for heating, and a circulation of hot water, largely the same as Mr. Baker's. Mr. Baker, in his device, obtains his heat entirely from the coil. We think the coil necessary ; and, in addition, we have a boiler. The boiler stands 29 inches high, 13½ inches at the top inside, 15½ at the bottom inside, 17 at the top outside, and 19½ at the bottom outside. It is made of ¼-inch steel, tested to 60,000 pounds tensile strength. Each one of our boilers, before the coil is put in, is tested 180 pounds cold-water pressure. We have a water space 1½ inches at the bottom and 1¼ inches at the top. Half-way up the boiler we connect the shell of the boiler with the coil from the outside. Water circulates from the coil into the chamber. The outside of the boiler is encased with Russia iron with a 2-inch air-space. When you have the biggest fire you can clasp the boiler with your arms, and if you can detect any more heat than you could by putting your hands on a board, we will give you the heater. It does not require the car to be lined with iron, nor does it crack the wood work. We furnish the same amount of heat at the further end as at the heater. With a simple coil-heater it is impossible to circulate the water as effectually as where the water is heated in a boiler and passed hot into a coil and then through the cars. By actual test, our system has been found to show a saving of over 40 per cent. in fuel.

Mr. Baker: Is not your boiler riveted—two sheets together?

Mr. Owens: Yes, sir. We have at the top and bottom a wrought-iron ring.

Mr. Baker: Suppose the water should get all out of the boiler and you had a smart fire going. Is there anything to prevent the boiler burning out?

Mr. Owens: We place with the boiler a water-glass so that the amount of water in the boiler can be seen at a glance. We have a device for injecting into the boiler at any time, against 300 pounds pressure, any amount of water.

Mr. Martin, of Dunkirk : I represent a system of heating which is now in practical use on the C., C., C. & I. road. Mr. Baker believes in having the heat at the bottom of the car, and in that respect we harmonize. Mr. Owens believes in having plenty of water to put out the fire, while we believe in not having any fire. The system we are using is simply a main pipe running under the train its entire lengths, connecting with the locomotive. About half the length of each car this main is tapped, the connections running to each side of the car, up through the floor, and extending from one end of the car to the other. These pipes return to the starting point, descend and meet underneath the car in a trap through which the water of condensation is discharged. A valve is placed in the car so that the heat may be shut off or turned on at will. The steam is run from the locomotive at low pressure. The main pipe is joined by metallic couplings consisting of a peculiar ball joint. A valve is also placed under the end of each car to shut it off from the rest of the train. Our theory is this : In order to have good ventilation you must have a superabundance of heating power for the coldest weather. You cannot advantageously use that heating power except you have control over it. Therefore, if you have a superabundance of heat and have a mild day, the people will sweat and grumble. It is estimated that on the C., C., C. & I. road it is possible to keep up the system I represent, with wear and tear, for 50 cents a month. There seem to be some drawbacks to all systems, and ours is this : We must have an engine to warm the train, but we leave them just where Westinghouse does with the brake. We have a stove in the car in case it ever becomes necessary, from long side-tracking or absence of the engine, to keep the car warm.

Western Railway Club.

There was a fair attendance at the November meeting of this club. President C. F. Pierce occupied the chair. Mr. C. E. Smart, General Master Mechanic of the Michigan Central Railroad, was elected a member.

Secretary Forsyth suggested that the Constitution of the club be widened to admit superintendents and managers of railroads to membership. Mr. Angus Sinclair suggested that it be made wide enough to admit other desirable railroad men to become members. The president appointed Messrs. Forsyth and Sinclair a committee to amend the Constitution.

AUTOMATIC BRAKES ON FREIGHT CARS

was announced as the first subject for discussion.

Secretary Forsyth read a letter from Mr. G. W. Cushing, Superintendent of Motive Power of the Northern Pacific, in which that gentleman strongly advocated the Westinghouse automatic brake for freight car equipment. He had entertained doubts about the automatic system as applied to freight trains, until he made trials of the Westinghouse automatic brake on the Vita Pass grade of the Denver & Rio Grande Railroad. The grade is 211 feet to the mile. The performance of the brake on that grade convinced him of its merits and practicability, and he has seen nothing since to change this impression.

Secretary Forsyth opened the discussion by reviewing the paper on Power Brakes for Freight Trains, recently read before the American Society of Civil Engineers, by Mr. W. P. Shinn. In this paper Mr. Shinn reports the Westinghouse brake as having been applied to 35,000 freight cars, and the American brake to 3,000 cars. The paper is decidedly favorable to the American brake. It gives the cost of equipping for the Westinghouse system at $500 per engine, and $56.50 per car ; for the American system, $225 per engine and $28 per car. The cost per year, including interest and maintenance, is, for the former, $5.67, and for the latter $2.20. Mr. Forsyth believed that Mr. Shinn was mistaken in his conclusions. He believed that the fact of its applying itself when a train broke in two, and the provision that permits the brake to be applied from the rear end of the train when necessary, were of sufficient importance to pay for the higher expense of the Westinghouse brake. After cars with this brake had been in service on the Chicago, Burlington & Quincy a year he found they did about as effective work in braking as when the brakes were first applied.

Mr. H. H. Westinghouse, who was present, having been called on to give his views on the brake question, drew attention to the fact that while the figures they gave as to the cost of maintenance of the brake were drawn from actual experience, the figures Mr. Shinn uses for the American brake are mere abstract estimates. We have assumed, he said, in starting this freight braking business, that certain ends are desirable and necessary ; first, a given efficiency, a given braking power for a car that is available at all times, and is nearly uniform ; and, secondly, that the action of the brake should be automatic in case of failure of a part that would disarrange the working. We think that nothing short of that will eventually be used.

Mr. A. Gartner, Assistant Engineer, Savannah, Florida & Western Railway, wrote a letter, to the president of the club, setting forth his views about automatic brakes, which was read by the secretary. Mr. Gartner spoke very favorably about the Carpenter air-brake system, a German invention, and said they were using some part of it in connection with their Westinghouse system.

Mr. Westinghouse explained that the brake in question was not patentable in this country, and was not available for use.

Mr. Verbryck did not believe that the braking performance of an experimental train, where everything was in perfect order, was of much value as a test of what a brake would do in actual service. He thought that was the weak part of Mr. Shinn's experiments. He did not like brakes actuated by the draw-heads of a car, for his experience was, that the draw-heads were very liable to get out of order. He gave reasons for the belief that Mr. Shinn's figures were very inaccurate.

Secretary Forsyth believed that the advantage claimed for the American brake because it checked a train on a sag was a disadvantage. It tended to waste the inertia of the train, which was habitually utilized to help a train up a hill. He asked how long a train could be operated successfully by the Westinghouse brake?

Mr. Westinghouse answered that so far as the automatic feature was concerned, the brake could be operated on any length of train, but that with more than 50 cars it would be difficult to manipulate the brake lightly. But they had lately got out an appliance which enabled the engineer to use a part of the brakes for light braking.

Mr. Sinclair mentioned that he had been in Omaha lately, and made inquiries about how the Union Pacific Railroad Company were getting along with their freight train brakes. They have already a great many cars equipped with the brake, and are running trains regularly which are controlled by it. They find that with very little practice one engineer gets to handle a train of 30 cars just as smoothly as passenger trains are handled. There is no difficulty about stopping at water tanks.

Mr. Cooke said they had no trouble in applying the brakes on his road. Their only cause of complaint was that the brakes would not come off so easily as they wanted. This caused more or less delay in starting.

BEST MATERIAL FOR JOURNAL BEARINGS.

This was the second subject selected for discussion.

Mr. J. N. Barr, Mechanical Engineer of the Chicago, Milwaukee & St. Paul Railway, wrote a letter to the president of the club on the subject of journal bearings, which was read. Careful experiments conducted on the above road had indicated that very soft bearings lose nearly 40 per cent. less in weight in service than hard brass or bronze ; and that journals under soft bearings decrease in diameter nearly twice as fast as those under hard bearings. This led them to doubt the economy of using soft bearings, but they believed that where a hard bearing was put on a journal without being properly fitted, it was more liable to run hot than a soft bearing.

Mr. McDevitt had been using soft bearings for twelve years with good results under street cars. He casts shells for his bearings and fills them up with Diamond anti-friction metal.

Mr. Cooke preferred solid brass bearings for freight cars that went all over the country. For that kind of service he did not think soft metal put in shells was suitable.

Mr. Verbryck's experience had been quite the reverse of Mr. Barr's with hard and soft metal. They were getting soft metal for years from a man named Fitz, and it gave much better service than brass when tried on the same truck along with the latter. But Fitz has sold out, and the metal they get from his successor is very unsatisfactory.

Mr. Cooke's experience with soft metal had been different from Mr. Verbryck's. He found that soft metal wore the journal more than brass. This was very evident on locomotive wrist-pins where Babbitt always wore the pin faster than the brass.

Mr. Pullman testified to the good service received from the Fitz metal mentioned by Mr. Verbryck. During the five years that metal was used, he found that the journals of all the wheels taken out were smoother and nicer, running parallel and in better shape than he found in the case where brass or any other metal was tried.

Secretary Forsyth : I know that Mr. Barr has made a great many experiments, and very careful ones, on bearings. He has probably experimented with them more than any other man in the country, and I should rather hesitate to disagree with him; but I am inclined to think that in this case his experiments have been made with poor boxes, and he has let in a lot of dust and grit, which has worn his axles more rapidly than the bearings. I think this subject of soft metal bearings is a very important one, and worthy of being followed up carefully. I think that if experiments are made with good boxes different results will be obtained. The filling is so cheap that that is certainly a recommendation. Antimony and lead can can be bought for about 5 cents a pound, and the hardness of the lead can be easily regulated by the amount of antimony in it. This is a product of some of the lead refineries, and can be bought in large quantities with any per cent. of antimony that you want. I am inclined to think that the best bearing—the most economical one—is a shell filled with antimony and lead, mixed in proper proportions.

After a few more remarks, in which no special point was made, the meeting adjourned.

A change in the constitution has been adopted, so that the meetings will in future be held in the evening, beginning at 7:30 o'clock.

Material Used for Boilers and Fire-Boxes.

Several letters on the above subject from master mechanics were received too late for insertion in our last issue. The leading facts given in these letters are as follows :

Mr. N. J. Paradise, Master Mechanic, Hannibal & St. Joseph Railroad, writes :

> We have but nine steel boilers on this road, the rest being of iron. I think iron does very well for boilers, but I prefer steel. All our fire-boxes, with but one exception, are of steel. My experience with iron fire-boxes is that after they have been in service about six months they begin to blister. In my opinion steel is the best material for fire-boxes.

Mr. Allen Vail, Master Mechanic of the Buffalo, New York & Philadelphia road, writes :

> We have been using steel for locomotive boilers exclusively since 1877 ; also have used it for fire-boxes ever since our road opened in 1870. During that time, we have had only three fire-box sheets crack. We have on our road at the present time 15 engines that were built with Otis steel fire-boxes in 1872 and 1873, which are yet running, and are in excellent condition, which goes to show that steel is superior to iron for fire-boxes. We had two engines with iron fire-boxes, and we were burning wood when these engines were bought. When we began to use coal, their fire-boxes did not run over four months before they were so badly burned and blistered it became necessary to take them out. As to steel for boiler shells, I am not prepared to say whether it is any better than iron or not, although we have about 35 engines with steel boilers throughout. We have yet to discover any defects in them. Our boilers are thoroughly cleaned and examined every time they are taken in the shop for repairs to have the tubes removed, and we have not discovered so far any pitting or grooving. As to our plans of construction, we conform to the usual practice in most instances ; our thickness of plates in shells is $\frac{7}{16}$ inch for 48 and 50-inch boilers, and ½ inch for 52 to 56 inch, all seams double riveted, and all parts well and thoroughly stayed. As to the details, it would be difficult to explain without drawings, and in conclusion will say that we shall continue to use steel for boilers until we find something better.

Mr. S. B. Haupt, Superintendent of Motive Power, Norfolk & Western Railroad, writes :

> While we have made some experiments with the view to determine, if possible, the relative value of iron and steel for fire-boxes on our road, we have not gone into the subject enough to enable us to give a final or decided opinion about it. So far as we have gone, however, we think it is altogether likely that steel fire-boxes will give us very much the best service. We have had some iron fire-boxes in use two years, but were obliged to renew them. There are, of course, many points bearing upon the subject, some of which are the variations in fuel and water in different localities. I can only say, therefore, with the class of fuel we have, which we consider very good and pure, we have so far obtained the best results with the use of steel for fire-boxes.

Mr. John S. Cook, Master Mechanic of the Georgia Railroad, gives the following particulars in addition to the letter published last month. He writes :

I hand you list of engines on this road, their age and mileages, that have their original steel fire-boxes, not one of which has cost anything for repairs :

Engine No. 25,	age 16	years, mileage	384,890
" " 26,	" 16	" "	512,721
" " 28,	" 16	" "	488,860
" " 29,	" 15	" "	562,544
" " 30,	" 15	" "	411,750
" " 33,	" 14	" "	411,682
" " 34,	" 14	" "	355,528
" " 35,	" 14	" "	335,045
" " 36,	" 14	" "	415,123
" " 37,	" 14	" "	423,181
" " 38,	" 14	" "	429,461
" " 39,	" 14	" "	399,159
" " 40,	" 14	" "	522,974
" " 41,	" 14	" "	395,694
" " 42,	" 13	" "	357,190
" " 43,	" 13	" "	346,040
" " 44,	" 13	" "	361,880
" " 45,	" 13	" "	324,871
" " 46,	" 13	" "	382,575
" " 47,	" 13	" "	380,738
" " 48,	" 13	" "	244,807

If these figures are of any use to you, you can use them in any way you wish.

Mr. G. W. Rhodes, Superintendent of Motive Power, Chicago, Burlington & Quincy Railroad, says that his road has not used iron for fire-box or boiler construction recently. Mr. Rhodes favors the use of steel, and sees no reason why iron should be used.

Mr. Francis R. F. Brown, Mechanical Superintendent, Canadian Pacific Railway, writes :

I have been using steel entirely in the construction of locomotive fire-boxes and to a large extent in boiler shells for the last eight years, and see no reason to discontinue its use. I am using mild Scotch steels, solid fire-box quality, and the results given are thoroughly satisfactory in every way. I make it a rule to constantly have a sample of the material tested, as we order it on a specification, and I never yet had to reject any of the plates.

Mr. C. C. Hobart, Master Mechanic, Oregon Railway & Navigation Company, writes :

For the past eight years I have been using Otis steel for boilers and fire-boxes, and think it preferable to iron or any other grade of steel which I have ever seen for these purposes, it being free from blisters, very ductile and easy to work.

Mr. A. J. Stevens, General Master Mechanic, Central Pacific Railway, writes :

During the past seven or eight years, we have used steel principally. Previous to using steel, we used Low Moor, Tennessee and other brands of iron. It is my opinion that Low Moor, Tennessee, or any other good iron will not deteriorate so rapidly from the injurious effects of bad water as will steel. In other respects I believe steel to be superior. We have had some trouble with steel fire-boxes cracking, and have also had difficulty with iron fire-boxes blistering. The annoyance resulting from such causes is about equal.

Mr. H. A. Whitney, Mechanical Superintendent, Intercolonial Railway of Canada, writes :

We have used steel exclusively for locomotive fire-boxes since 1869, and would not think of resuming the use of iron for that purpose. All engines built for this railway within the last three years have had boilers entirely of steel, which we consider better and cheaper than Low Moor or Bowling iron, used previously. We began the use of steel for fire-boxes because of the trouble given us by iron in blistering. In some locomotives crucible steel was used, in others open hearth. Crucible was found to be harder to work than open-hearth, as it did not appear to be so ductile. More care was required in flanging also.

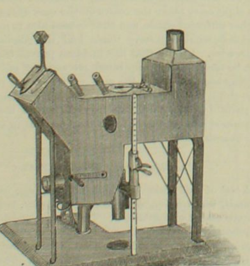
Some trouble has been experienced with steel cracking, in every case, I believe when cold. Sometimes the cracks appear in the corners, at others round the door, and once in a while up and down the side sheets. These cracks are no doubt caused by excessive strain upon the sheets, produced by contraction, which contraction, in my opinion, is made possible by a chemical change in the material, after service.

I have taken samples of steel from an old fire-box, and had good cold chisels made from them, showing clearly that a change had taken place, as this steel before being used was as soft and ductile as any iron, and would not harden at all. I raise this question so that others who may have the opportunity can experiment further, and possibly determine the vexed question, "Why do steel fire-boxes crack ?"

The Brown Tube-Brazing and Welding Machine.

The engraving gives a perspective view of a machine in use in the machine shops of the Union Pacific Railway, at Omaha, for brazing and welding tubes. It is the invention of Mr. R. H. Brown, foreman of the shop where the tubes are brazed and welded, and it turns out the work very rapidly. We recommend the apparatus to the attention of master mechanics working for labor-saving devices.

The top of the furnace is attached by bolts so as to allow of its removal when it requires rebricking. The top has also peep tubes for observing the work while in the furnace. The top and bottom of the furnace are formed with apertures for the brazing post, which is attached by screwing to a support. The support is suspended by an arm from a slide, which is fitted for movement on a vertical standard at the side of the furnace, the slide having a suitable catch engaging the standard to sustain the post in any position in which it may be placed. A weight is also provided for counterbalancing the slide, post and flue, so that the post can be moved up and down more readily. The support is fitted at its under side with a hollow extension for use with flues longer than can be received by the post. The hole in the top of the furnace has sides closed tightly around the flue while the brazing is progressing.



The lower one of two swages is supported by a fixed standard, and the upper one is carried by an arm pivoted to a bracket. To the arm is connected a spring that serves to throw the moving swage upward after each blow. This movement allows the flue to be turned while being operated upon. The mandrels and swages are made removable from their supports, so that they can be replaced by others of different sizes, according as the work may require.

In the operation of brazing the flue is supported by the post, which may be lowered to bring the end of the flue within the furnace for heating. When properly heated the post is raised, and the end of the flue is thus projected from the opening in the top of the furnace in position for convenient manipulation. In welding, the flue is passed through the openings so as to bring the joint within the furnace. In this position it can be observed through the peep tubes, and when the required heat is obtained it is drawn out upon the mandrel and between the swages. Then by striking the movable swage with a hammer the work is readily completed. These operations may be performed at a great saving of time and fuel. The tubes while in the furnace are free from contact with the fuel, so that the joints are left clean and a more perfect connection insured than when the brazing or welding is done in the fire. The workmen are free from the heat of the furnace, the sparks and the dust, while at the same time are able to watch the heating operation closely.

Weighing the Hammer Blow of Locomotives.

At the last meeting of the Master Mechanics' Association, a committee was appointed to co-operate with a committee of the Franklin Institute in investigating the hammer blow of locomotives. The committee on the part of the master mechanics consists of Wm. Woodcock, Phila & Reading R. R., Elizabethport, N. J.; Thos. L. Chapman, Ches. & Ohio Ry, Richmond, Va.; Coleman Sellers (Wm. Sellers & Co.), Philadelphia; Angus Sinclair (NATIONAL CAR-BUILDER), Chicago, and F. W. Dean, Dickson Mfg. Co., Scranton, Pa. The committee of the Franklin Institute consists of Prof. P. H. Dudley, Grand Central Depot, New York; T. N. Ely, Pennsylvania R. R., Altoona, Pa.; Prof. S. W. Robinson, Ohio State University, Columbus, O.; Edwin Longstreth, Baldwin Locomotive Works, Philadelphia, and Thomas Shaw, Philadelphia A joint meeting of the committees was held recently at the Franklin Institute, Philadelphia, and arrangements were made to proceed with the required tests. Mr. Shaw has devised an apparatus which, it is believed, will weigh the amount of concussion received by the rail from the driving-wheels of a locomotive not being properly balanced. The drivers of a locomotive will be made to rest on rollers free to revolve, which, in their turn, will rest on a hydraulic dynamometer, which is provided with the means of registering the weight. The apparatus is being constructed at the Baldwin Locomotive Works. It will be the application, on a large and improved scale, of the plan often used in engine-houses for revolving the wheels of driving-wheels when the valves are being set. In the present case steam will be applied to turn the engine wheels, and the pressure put on the rollers by the driving-wheels will be weighed.

Doubled-Decked Sheep Cars.

At a meeting of the General Freight Agents held in Chicago lately, decided action was taken against carrying sheep in double-decked cars. A belief prevails that if sheep are carried regularly in cars of this make, a demand will soon be raised to use them for hogs also, and as the cars are useless for return freight, it is not considered desirable to encourage their use. In countries where many sheep are raised, double-decked cars are regarded as a necessity for handling them, but it is not believed that building cars specially for handling sheep would pay many railroad companies in this country. Their general freight agents are sagacious enough to perceive that if cars of this kind were brought into common service for handling hogs, it would only be a short time before they would be required to haul a double-decked load for the price now paid for the number of animals that occupy a single floor. So, being wise in their generation, they decided not to haul animals in double-decked cars for any consideration.

The Northern Pacific Railway Company, however, regard the double-decked car matter in a different light from the view taken by Chicago roads representatives. They are doing a large and increasing sheep business, and find that it can only be handled economically by using double-decked cars, and cars of this style they want sent through to Chicago when loaded to that point. As the general freight agents have decided that these cars shall not be accepted by pooling roads, the Northern Pacific people are under the necessity of having their sheep business sent to Chicago by roads that follow the free lance style of doing business. A good deal of hard feeling has been raised over the matter, and it has somewhat strained the relations between the Northern Pacific and connecting roads.

A One-Rail Elevated Railway.

Parties in Boston have obtained a charter to construct one mile of this kind of road in the city of Cambridge. An engine and car adapted to the structure are also to be built. If the road, when completed, is approved by the Railroad Commissioners, the projectors will be allowed to build such roads in Boston with the permission of the city government.

The structure consists of a single rail elevated upon a line of posts 14 feet from the ground. It is called a single rail, though perhaps a more correct description would be two rails placed one above the other at a distance of 4 feet, and connected by a series of braces. The supports or posts are placed at distances of 45 feet, and are almost exactly like those of the New York Elevated Railroad, except that the lower end is firmly incased in concrete and rests upon a solid bed of concrete several feet underground. The truck frame of the cars is placed astride the rail, like a saddle upon the back of a horse, and each truck frame has six wheels. Upon either side, two of these wheels run upon the lower part of the rail, inclining upward and outward from the point of contact at an angle of 45 deg. The other two wheels are placed horizontally under the car, and level with the top of the rail, along the sides of which they run, one upon each side. By means of hydraulic pressure applied from the engine, they are made to clasp the rail tightly, and by this power of traction the forward or backward motion is secured. Each wheel has an independent axis of its own, and the opposing wheels are always kept at right angles with the rails, regardless of curves. Some of the curves may be very sharp; steep grades may be overcome by means of the traction power. The truck frames of the locomotive are like those of the car, with the connecting-rods attached to the horizontal wheels upon either side of the rail. The pressure of the wheels upon the rail is such as to make it almost impossible for them to leave it, but in case this should happen the car could not leave the track, but would drop 1¼ inches and slide along, resting upon the top of the rail, the truck frame serving as a substantial brace upon both sides. The cars are cylindrical in form, and built of iron.

Identifying Relics of Early Railroad Machinery.

Historical data about our early locomotives from living authorities are getting to be regarded as very interesting and valuable, for there are not many men left who were familiar with the details of railroad machinery during the first decade of the railroad age. David Matthew is one of the remaining railroad pioneers, and his account of what was done with early railroad machinery ought to be of high historical value; but there is reason to believe that the old gentleman's memory is failing, for many of his published reminiscences do not agree with old records, and other railroad pioneers, whose means of judging what was done with certain machines were indisputably good, flatly contradict some of Mr. Matthew's statements. The final disposal of the machinery of the "De Witt Clinton" is a case in point. Mr. Matthew asserted that the machinery of that engine was put in a steamboat, but Mr. Walter McQueen says that is a mistake. The latter gentleman remembers distinctly all about the disposal of the De Witt Clinton's machinery, and he says it was sold as old scrap along with a lot of old car material, that one of the cylinders was broken up and went to the cupola, but that the other one was sold to a man in West Troy who fixed it up as a stationary engine, and it was running not long ago. Mr. McQueen is interesting himself in the matter and intends searching up the old relic. Mr. Matthew held that the old wheels now in the museum of the Grand Central Depot, New York, originally belonged to the "Experiment," the first engine that John B. Jervis built with a truck, but Mr. McQueen identified those wheels as belonging to the De Witt Clinton, and old drawings go to substantiate his views.

Linear Advance in Eccentrics.

Mr. Ralph E. State, chief draftsman of the Cincinnati, Hamilton & Dayton Railroad, and, like many others of his class, an able mechanical engineer, contributes to the *American Machinist* the following formula, which may be found useful by master mechanics and draftsmen :

Let L = Lap of valve.
Let E = Throw of eccentrics.
Let T = Travel of valve.
Let X = Linear advance of eccentrics.

$$\text{Then } X = \frac{LE}{T}$$

EXAMPLE :

Lap of valve .625″.
Throw of eccentrics 4″.
Travel of valve 5″.
Then $.625'' \times 4'' = 2.50. \div 5.'' = .5''$ = linear advance of eccentrics.

Travel of valve is found by dividing the difference in length of rocker arms by 2, adding throw of eccentrics.

EXAMPLE :

Lower arm 8″, upper arm 10″.
Throw of eccentrics, as above, 4″.
Then $10'' - 8'' = 2'' \div 2 = 1 + 4 = 5''$ = travel of valve

The above is applicable where the upper arm is the longer, which is the usual practice.

F. H. Henry, of Wakefield, Mass., is the inventor and patentee of a car seat attachment so constructed that in reversing the back, the cushion, without the back coming in contact with it, is simultaneously tilted (working automatically) thereby preventing the tendency to slide forward. The invention consists of a malleable iron striker-arm and two hangers or suspension arms attached to each end of the seat frame and connected by a rocker-arm. It can be applied to Buntin seat frames and also to seats with wooden arms. The attachment is in use on the Boston & Maine, Boston & Albany and Long Island roads.

Communications.

The Optics of a Railway Signal Lamp.

To the Editors of the National Car-Builder :

The conflicting claims of different makers of lenses has led the writer to make a series of tests of the different shapes and qualities of lenses used in railway signal lamps.

Thinking that the mode of testing the lenses may interest the readers of the NATIONAL CAR-BUILDER, I give the method adopted in full. For convenience, the subject will be discussed under the following sub-divisions, viz. : Spherical Aberration, Purity of the Glass, Photometric Tests.

SPHERICAL ABERRATION.

The forms of lenses in common use in signal lamps are shown in Figs. 1, 2, 3, 4, 5 and 6. Fig. 1 is a lens now seldom seen in railway practice, being supplanted by others more perfect in form and lighter in material. The law for the survival of the fittest here prevails, as well as in the animal or vegetable kingdoms.

Fig. 1 is deficient in this particular: Parallel rays of light nearest the axis of the lens, are refracted to a focus more remote from the lens than those which are incident at a distance from the axis of the lens.

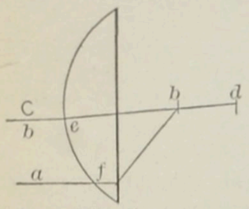


Fig. 1

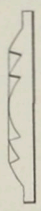


Fig. 2

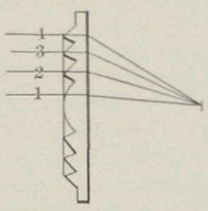


Fig. 3

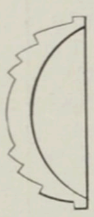


Fig. 4

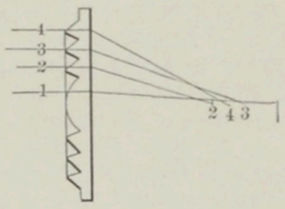
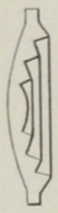


Fig. 5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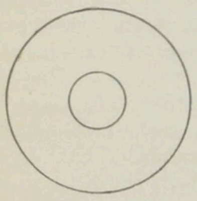


Fig. 7

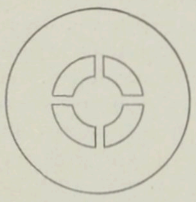


Fig. 8

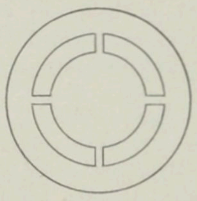


Fig. 9

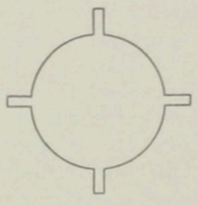


Fig. 10

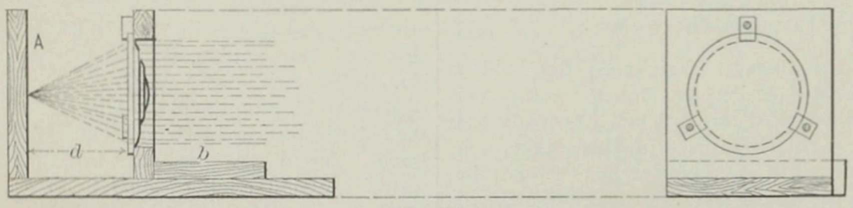


Fig. 11

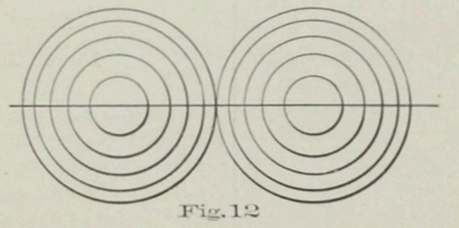


Fig. 12

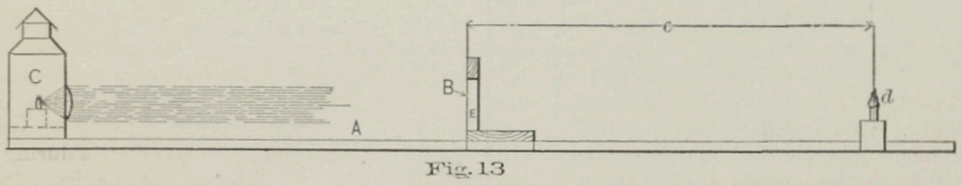


Fig. 13

In this lens, either by experiment or projection of the rays of light, the ray *a* will meet the axis at *b* and the ray *a* at *d*. The distance *b d* is called the *spherical aberration*, and in this form will amount to $1\frac{17}{100}$ of the thickness of the lens. As the central parts of the lens refract the light too little and the outer parts too much, it is clear, if we could increase the convexity at *e* and decrease it at *f* we should remove the *spherical aberration*. The ellipse and hyperbola are curves of this kind in which the curvature decreases from *e* to *f*, but while a lens of this form is perfect, yet the great difficulty of making these curves, has prevented its introduction. Corrugated lenses, invented by Fresnel, are the forms in general use, and in comparison with the plano-convex, can be made much lighter, and the spherical aberration corrected by making the foci of each zone coincide, as in Fig. 3, in which rays of light coming from the focus are refracted into parallel lines; and by the law of *conjugate foci*, the reverse holds true, namely, light falling on the lens in parallel lines is *refracted* to a focus. To determine experimentally if the light falling on a certain lens was refracted to a focus free from spherical aberration, a series of opaque diaphragms were used, so arranged that zones 1, 2, 3, 4, Fig. 3, could be tested separately. The diaphragms were made from a thick piece of drawing paper, on the plan shown in Figs. 7, 8, 9 and 10.

For measuring the aberration of the lenses, an instrument was devised, shown in Fig 11. This was made very simply, and the material was pine wood. The face *a* is covered with white paper, *b* is a sliding piece carrying the lens to be tested. The method of testing is this : The lens is held on *b* by three wooden clamps, and a diaphragm, Fig. 7, placed on the lens, stopping off all the light except the central ring 1. The instrument is turned to the sun, and the sliding piece moved to and fro until a clear image is obtained. The distance *d* is noted; the diaphragm, Fig. 7, is removed, and Fig. 8 put in its place and tested, the ditsance *d* is noted, and so on, until all the zones are tried. Fig. 5 shows the aberration of a certain lens as found by this instrument.

PURITY OF THE GLASS.

The comparative purity can be tested by observing the appearance of a black line upon white paper, when the lenses to be compared are laid upon it. The lens that shows the darkest line, is the one made from the purest glass. Care should be used in this test, that the edge of lenses only be used, as they have parallel sides for a short distance. This can be done, and any error arising from the different curvatures be avoided. Fig. 12 shows the position of the lenses in regard to the black line.

PHOTOMETRIC TESTS.

In my first photometric experiment, the method of comparative shadows was used as devised by Rumford, but was finally abandoned in favor of the photometer invented by Bunsen. Rumford's photometer, on account of the different sizes of shadows, makes it difficult to decide when they are of equal intensity. Bunsen's being based on a different theory, practically easy to manipulate, and at the same time accurate, led to its adoption over the other forms of photometers in use. My photometer was made from pine wood. See Fig. 13. The strip *A* is 10 ft. long. *B* is a paper screen on a sliding piece of wood. *C* is a lamp so arranged that lenses can be introduced quickly. *d* is a sperm candle used in these experiments as a standard of comparison. The paper screen is glued upon the sliding piece while wet ; when dry, it becomes tight like a drumhead. The aperture in *e*, over which the paper screen is placed is 8 in. in diameter ; in the center of the screen a grease spot is made about ½ in. in diameter.

This is best made with spermaceti dissolved in naphtha. The theory of the spot is this : The spot allows more light to pass through it, and consequently reflects less than the unstained part of the paper; if, therefore, the paper be illuminated more strongly from behind, it appears bright on a dark ground. On the other hand, it appears dark on a white ground if it be more strongly illuminated on the front surface ; while with equal illumination the spot becomes invisible, since it can not then appear either darker or lighter than the adjoining paper. The lenses are tested by moving the candle until the grease spot disappears. The distance *e* is noted for each lens under consideration. They are to be compared with each other inversely as the square of the distance *e*.

The apparatus used by me in testing did not cost over $3, being made principally from pine wood, utilizing an old switch target lamp to hold the lenses in the photometric tests. While the cost is but small, the satisfaction is great. Where uncertainty before existed, no obstinate doubt remains after such tests.

RESULTS.

1. It has been found by means of these tests that lenses from the same makers often vary 7 per cent. in their transmitting power, although to the eye they are apparently similar.

2. Lenses by different makers vary as much as 50 per cent. in light transmission.

3. Certain lenses were so deficient that the outer zone could be stopped out, and the quantity of parallel light transmitted would not be affected thereby.

4. A removal of the flame ½ inch from the focus reduced the light in one instance 20 per cent.

Always have the flame in the focus, if the best results are wished for.

T. A. LAWES,
Nov. 1, 1885. C., C., C. & I. Ry., Cleveland, O.

Temporary Color Blindness.

To the Editors of the National Car-Builder :

In view of the fact that it is becoming quite general to test train-men for color blindness, it seems to me that it might be a good thing to call the attention of persons conducting such tests to an incident that occurred in our division not a great while ago. One of our firemen was one day called off his engine to come into the examination car to be tested, and it was found that he seemed to be very deficient in the distinguishing of colors, and orders were accordingly issued that he be discharged. The young man, however, thought that there was something wrong about it, and from private tests made by himself he came to the conclusion that he was all right, and applied for the privilege of a second examination, which he passed very nicely.

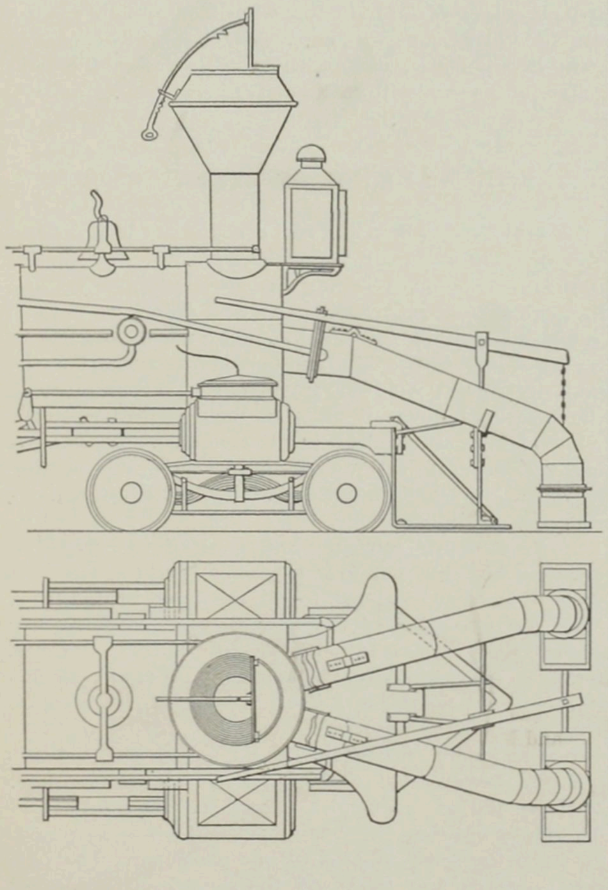
Upon investigation, it was found that just before he was called for examination the first time, he had been engaged in fixing up the fire in the locomotive, and his gazing into the hot and glaring fire-box had so blinded and obscured his sight as to make the colors on the rack assume an altogether different shade, and thus caused him to make errors which he would not have made had the conditions been otherwise. I think that this incident proves that persons can be temporarily color blind on account of their eyes having been used as in the case of this young man, and I also think that it should teach color-blind committees to be careful to ascertain just how the eyes of the one to be examined had been used for at least an hour or two before the examination. C.

The Waldumer Electric Brake.

A test of this brake was made not long ago on the Cincinnati, Washington & Baltimore Railway, between Cincinnati and Madisonville, O. The train consisted of three coaches, one private car, one baggage-car, and one Grant engine, with 16 × 24 cylinders, with the veteran E. Rother in the cab and Charley Howard conductor. The object of backing out to Madisonville was to make a fast run in and give the first public test of the Waldumer electro-magnetic brake, with which the train has been fitted up, and which has worked to a charm for two months. Former tests of this system of braking have been made on freight trains with the most satisfactory results. The electricity is generated by a small dynamo machine worked by the running of the engine. The engineer has a small lever at his right hand, which when thrown forward by an easy push takes up all the "slack" for the entire train and puts the shoes of the brake up close to the wheels. With another small lever is graduated the pressure at pleasure, from slowing up to a full stop. A child could instantly and easily apply the power. The brakes, when applied, are with electric quickness forced upon the wheels of every car in the train, whether long or short, at the same instant, so that there is no jar by the rear cars running upon the others. It is claimed, and seems apparent, that cars without platforms or buffers would not jostle each other—this having been demonstrated on freight trains. Another advantage is that on a train parting the engineer is instantly notified by the continuous ringing of a bell in the cab, while the brakes for the forward part are still in readiness for instant use. "Never out of order" and comparative cheapness are also features on which the company depend to enable them to compete with the formidable non-electric brakes, which have already so strong a hold on the railways of the west. The inventor, A. L. Duwelius, was on board, and explained, so far as possible, the principles on which the brake acts. On the Norwood grade the guests were landed and the train backed up three-quarters of a mile. It was then, at full speed, run down the grade, which is at this point sixty-eight feet to the mile, and its speed is judged to have been forty-five miles an hour, when General Manager Stewart signaled for the brakes. They were applied, and the stop made in about two train lengths. It was the most remarkable stop, experts said, they had ever seen, grade, speed and distance considered.

Hawksworth Weed-Burning Machine.

The greater part of the railroads throughout the country are ballasted with sand or surface earth, which in summer produces a rank crop of weeds and grass. When the crop of weeds gets high enough to touch the top of the rails, their lubricating properties decrease the friction between the rails and wheels so seriously that during damp weather locomotives lose three-quarters of their ordinary power for pulling trains. The usual remedy for this evil is for the trackmen to dig up the weeds by the roots and throw them clear of the track. This is a tedious operation, and while the growing season lasts, the regular force of trackmen are kept busy cutting weeds, for by the time they reach one end of the section, a fertile crop is ready for them at the other end. In addition to the cost for labor to do this work, the operation of weed cutting is an injury to the track, for the smoothness of the surface is broken, and water lodges in the structure, leading to soft spots, with all the evils of bad joints and uneven track. Several machines for cutting the weeds have been invented, but none of them have ever done the work. Perceiving the trouble and expense to which his company was annually subjected from the weed nuisance, Mr. D. Hawksworth, master mechanic of the Chicago, Burlington & Quincy Railroad, at Plattsmouth, Neb., conceived the idea of burning the weeds, and after cogitating over the problem for months, he designed the attachments to a locomotive, shown in our engraving, to be used for the purpose. The device consists of two pipes passing through the front smoke-box casting, and ending in large conical openings, which are set a few inches above the rails. The exhaust pipes are arranged to pass the exhaust steam from the cylinders into the burning apparatus pipes, and live steam from the boiler is used as a suction blower to draw the gases that pass through the tubes into the pipes leading to the weed burner. When this operation is in progress the top of the stack is closed by a lid provided for the purpose. This weed burning locomotive has been in service for two seasons, and it has done the work of destroying the weeds admirably. It is moved along at the rate of about three miles an hour, and there is no difficulty in providing the steam and heat that burns up the weeds. The device is patented by Mr. Hawksworth. Several other Western roads have determined to burn their weeds in this way next season. The division superintendents where the apparatus has been at work are highly pleased with its efficiency.



Ditching Machine Worked by Compressed Air.

During a recent visit to the machine shops of the Burlington & Missouri River Railroad, at Plattsmouth, Neb., we saw a ditching machine which is operated by compressed air, the arrangements for transmitting power in this shape having been designed and carried out by Mr. D. Hawksworth, M. M.

This machine is intended to make or clean out ditches at each side of a railway track, and especially for cleaning out ditches in deep cuts when they have been filled by heavy rains, and where haste in cleaning is especially necessary. The machine carries four large scoops or shovels (two on each side of the car), capable of holding one cubic yard of earth in each shovel, which are suspended at the end of levers fulcrumed on short adjustable standards placed a little outside the side stringers of the car, so that the center of the shovels are about 4 feet 8 inches from the rail, and about 3 feet from the side stringers. These shovels can be tipped to any desired angle, and are held rigidly in position when cutting the ditch. The back ends of these shovels are connected to arms projecting from the large wooden shaft, which is placed across the car and projects at each side, and also forms one side of the frame which holds the shovels in position; this shaft moves on journal bearings placed on the side stringers and also in the center of the car; in the center of this shaft is a lever handle provided with quadrant and spring locking pawl. By operating the lever any desired inclination is given to the shovels for cutting or dumping. The front ends of the shovels are supported to resist any downward dragging tendency in their operation, by chains attached to the swinging handles of the shovels, and hooked to the arm or frame which extends across the car in front of the shovels.

The four shovels are raised and lowered by the levers, to one end of which is attached a chain which winds on a drum placed underneath the car. On the shaft carrying this drum is a ten-inch pinion wheel, which is rotated by a rack working in a guide over the pinion. This rack is attached to a piston rod of an air cylinder.

In operation, the shovels are lowered down and are given a little tipping position, the back shovel being placed a little lower than the front. The shovels are held rigidly in this position, while the locomotive in attendance draws the machine along until the shovels or scoops are filled. They are then raised up by admitting compressed air into the back end of the cylinder, and the rack passes over the pinion, rotates the drum and winds on the chain, so that with one stroke of the piston the shovels are quickly raised from the ground to the required height. The locomotive then runs along to a convenient place for dumping; this operation is done by the aid of an air cylinder connected with the dumping lever.

The compressed air used in these cylinders for operating the machine is obtained from the air-brake pump on the locomotive in attendance, and is stored in a tank placed in the center of the car.

The frame or arms holding the shovels in position, and extending from the sides of the car, are in three sections; the center section is secured to the deck of car, and the two outside sections are hinged to the center one. The chain attached to the timber (connecting these hinged arms) is carried over sheave pulleys on the upper end of two uprights in the center of the car, and is then passed down and hooked to a drum placed underneath the car, which is rotated by a pinion and rack attached to an air cylinder. By this means the frame or arms can be folded up by turning the end sections on their hinges, thus bringing the whole device inboard, which is necessary for transportation and housing. It is without doubt a great labor saving machine, and is working very satisfactorily.

The device is the invention of Mr. D. Freel, of Chariton, Iowa, roadmaster for the C., B. & Q. R. R. at that place, and is patented by him.

Proved Her Value.

Some years ago a gentleman in Iowa who was well known as a successful agriculturist and agitator in favor of granger legislation, became possessed of a desire to figure as a railroad magnate. He projected a railroad that was intended as a rival to existing lines. Believing that a good railroad could be built at one-tenth the cost usually represented as the expense of railroad construction, this agriculturist proceeded to demonstrate his ability as a railroad builder, and he succeeded in getting a few miles of track in running order. All the material used was old second-hand stuff that established roads could no longer use, and he succeeded in building a cheap road so far as it went. A connecting road had an old locomotive which was popularly known as the "Mud Hen," owing to her propensity for the ditch. This locomotive the agriculturist bought to operate his road. Shortly after the purchase had been made, a friend who had some knowledge of machinery, and did not approve of the Mud Hen purchase, ventured to expostulate with the new owner. "Not a good engine, did you say?" he replied; "you must be mistaken. The Rock Island Railroad would never have kept an engine twenty-five years if she had not been a good one."

An Electric Brake.

From Germany comes a description of an electric brake for passenger and freight cars on railroads. The brake-shoe is the core of a peculiar-shaped electro-magnet, formed to the curve of the wheel. A spring holds this away from contact under ordinary circumstances. The current is furnished by a dynamo on the locomotive, run independently, the switch being in easy reach of the engineer. To circumvent accidents the brake circuits are arranged in multiple arc, so that any mishap which may disable one of these will not affect the remainder. This form of brake would be easily arranged for use on electric railways, and peculiarly adapted for that form of transportation. Yet, while this at first sight appears to be quite perfect in its arrangement and reliable in its action, one or two points present themselves as being possibly objectionable. In the first place the close adherence of the metal brake-shoe which is necessary to obtain the desired end, induces an immense friction and consequent development of great heat. In the ordinary wooden brake this often results in the burning of the shoe; such heat would necessarily destroy the insulation of the coil; and again the constant jarring vibration would probably crystallize the wire connection, rendering these brittle and eventually break them. Still, these objections may be overcome, and the electric brake will by and by fight its way into permanent commercial existence and value.

The Union Pacific Railway Company are equipping all their engines with the extension front end, as fast as they go into the shop for repairs.

Mr. G. W. Tilton, Superintendent of Motive Power of the Chicago & Northwestern Railway, was not favorably impressed with the extension fronts for locomotives, but, like an enterprising man which he is, although conservative, he put two extension fronts on for trial and kept a close record of the engines' performance. The result is that he intends putting extension smoke-boxes on all the engines as fast as they come in for repairs. They use a brick arch in all their engines. Many master mechanics are getting to believe that the brick arch must accompany the extension front to make it successful.

Wilson, Walker & Co., Pittsburgh, are proprietors of a recently patented car-axle lubricator, in which the oil chamber is located in the hub of the wheel, passages being provided for carrying the lubricant thence to the journal. The same firm also assigned control of a patented method of forming solid forged steel draw-bars, which consists in punching out a portion of the metal from the body of a properly shaped blank, and hammering or wedging down the head of the blank to form the face-plate. It is a systematic way of getting out the automatic draw-bar which the company sent to the late test at Buffalo.

The Chicago, Alton & St. Louis Railroad Company are using a cast-iron whistle for their locomotives, and it is giving so much satisfaction that they do not intend making any more brass whistles. The whistle consists of an oblong box with straight slots on each side for emitting steam. The steam strikes on a thinned edge of the casting, and the impact produces as much noise as the greatest enemy of the human race could desire. The most commendable features about the whistle are that it needs no repairs and seems indestructible and everlasting. The device is made by the Bass Foundry and Machine Works, Fort Wayne, and costs only $3.

A committee, consisting of Messrs. Walter McQueen, Thomas Purvis and William Buchanan, has been appointed to receive subscriptions for the purpose of erecting a suitable monument over the resting place of Henry Waterman, who rendered such eminent services during his lifetime in the interest of American mechanics. The inventive genius of Mr. Waterman contributed greatly to promote improvements in locomotive, fire and stationary engines, and many industries in this country are now reaping the reward of his ingenuity and skill. Any one willing to subscribe toward honoring the memory of Henry Waterman should send the contribution to A. G. Leonard, Room 14, Grand Central Depot, New York.

We clip the following item from the *Manufacturers' Record*:

The Shenandoah Valley Railroad has recently put on new sleeping cars between Hagerstown and Roanoke, for which the charge for a night, the time of the run between the terminal points of the road above named, is only one dollar, just half the Pullman charge for the same service. These sleeping cars have been constructed by the railway company itself for its own use. The editor of the *Virginias* pronounces them not only equally as comfortable and pleasant as the Pullman sleepers, but in several particulars much more agreeable, especially in this, that there are no upper berths; thus making every berth at the half single rate as airy and pleasant as a whole section in a Pullman sleeper, for which the charge is never less than four dollars.

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EDITORIAL ANNOUNCEMENTS.

Addresses.—*Business letters should be addressed, and drafts and money orders made payable, to* THE NATIONAL CAR-BUILDER. *Communications for the attention of the Editor should be addressed* EDITOR NATIONAL CAR-BUILDER.

Advertisements.—*Nothing will be inserted in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *The editorial department will contain our own views and opinions; and the rest of the reading matter, aside from advertisements, will be such as we consider of interest to our readers.*

Contributions.—*Articles relating to railway rolling stock, construction and management, and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notices of changes in railroad officers, organizations and names of companies.*

Special Notice.—*As the* CAR-BUILDER *is printed and ready for mailing on the last day of the month, advertisements, correspondence, etc., intended for insertion, must be received not later than the 25th day of each month.*

THROTTLING THE LOCOMOTIVE.

Considerable talk can be heard in mechanical and scientific circles these days, about the desirability of using engines with improved valve gear, compound locomotives, or electric motors, in order to make better use of steam in land transportation. Observations we have made in the course of widely extended railroad travel during the last six months, has forced us to the conclusion that a much greater percentage of power could be obtained from the steam now used, or considerably less steam would be necessary to perform the work of pulling our trains if the boiler pressure were admitted freely to the steam chest when the engine is working. This is rarely done unless when a locomotive is working hard. It is safe to say that nineteen out of twenty locomotive engineers habitually throttle the steam, unless they are compelled to open the throttle wide to prevent the engine stalling.

Every one familiar with steam engineering knows that during the last twenty-five years great progress has been made in rendering the stationary engine economical in the use of steam, and we all know that an important part of the economy of an automatic cut off over the throttling engine, is due to the steam being admitted freely to the cylinder, so that a high percentage of work may be obtained from expansion of the steam. This knowledge being widespread, it is curious that locomotive engineers, as a body, have not become impressed with the importance of keeping the throttle wide open, and of regulating the speed by the reverse lever. A circumstance that conspicuously illustrates the importance of this matter happened lately on one of our best managed roads. Six new passenger engines were purchased by this road from one maker, and they were of the same dimensions in every particular; but three of the engines were equipped with a steam reverse gear. The engines were all put on the same kind of service, and a very good fuel record is kept on the road. It was soon found that the engines with the steam reverse gear were running with from 10 to 15 per cent. less fuel than the engines that had the ordinary reverse lever and notched quadrant. The difference was kept up month after month, and the master mechanic had the matter investigated. There was considerable difficulty in discovering the cause of the difference, but it was eventually traced to the way the engines were worked. The steam reverse was operated by a small, easily worked lever, that was close to the hand of the engineer when he was on his seat, and the throttle lever was high up in a position where it was not convenient to keep the hand constantly grasping it. The consequence was that the men handling the steam reverse got in the habit of regulating the speed of their engine by it exclusively, and hence their improved record in the use of steam.

Unless on trains where the engine will not run fast enough with the reverse lever down, there are very few locomotives run to cut off shorter than nine inches of a twenty-four inch stroke. The men who run the engines are not to blame for this condition of affairs, for they have not been encouraged by precept or example to handle their engines differently. The greater part of them have no means of knowing where the steam is cut off when the lever is in certain notches, and in too many instances there are not enough notches in the quadrant to admit of speed being regulated by that means.

When locomotives get into bad order, owing to the natural wear of service, the dictates of economy require that they should be put into the shops for repairs as soon as possible, but numerous roads are behind in the repairs of their motive power, while others follow the policy of keeping engines at work so long as they will run without obstructing the traffic. The consequence of this is, that many locomotives in very bad order are still kept pulling trains. Every man who has anything to do with handling engines in this condition is aware that they are operated at great expense for fuel. There is every reason to believe, however, that many of the half-worn engines kept at work on account of the needs or policy of roads using them, could be greatly improved were proper means taken to arrange the distribution of steam properly or as far as the deteriorated condition of the motion would admit. So long as the sound of the exhaust indicates that an engine is working square, many master mechanics accept that as conclusive evidence that the valve motion is all right, although as a matter of fact the exhaust sound is a most deceiving means of judging the condition of steam distribution. All that a square exhaust demonstrates is that a fairly uniform volume of steam enters the cylinders and passes out at nearly uniform periods. It gives no clue to conditions that indicate waste or economy of steam. The locomotive may be working under all the disadvantages of restricted or post admission, wasteful back pressure and obstructive compression, yet the exhaust may tell those who believe in its note, that the engine is working admirably. There are too many who believe implicitly in that note and are grievously deceived by it.

On a western road recently, a locomotive that was getting well worn began to stall on hills with trains she ought to have taken over easily. The master mechanic applied an indicator, and found that the valves were badly cut, although the engine gave no sign of it by the exhaust. The valves were squared and the engine took her trains along easily, with considerably less fuel. The improvement on that engine alone paid for the indicator. If the indicator were called more into requisition as an ordinary method of finding out what locomotives are doing with their steam, it would be the best paying instrument about a locomotive establishment.

MACHINERY AND OVERPRODUCTION.

The recent improvement in business after two years of comparative stagnation, very naturally suggests the inquiry whether the improvement is likely to be permanent or transient. It would be folly to dogmatize upon such a question when so many complications have to be disentangled in order to get at the truth; but, judging from the tenor of current newspaper discussion for several months past, it is pretty clear that the theory of overproduction is slowly but surely gaining ground, as opposed to the apparently opposite theory of under-consumption. In the sense in which they are ordinarily used, the two terms really mean the same thing, and to make any radical distinction between them in considering the industrial problem, is to juggle with words and reason in a circle. The most stolid observer can not shut his eyes to the fact that manufactured products have been multiplied during the past fifty years by means of steam and machinery to an extent beyond computation; and it is no less evident that labor-saving appliances will keep on increasing in quantity, capacity and adaptation, for an indefinite period in the future. What is labor-*saving* ought to supersede labor, or lessen it in the aggregate. An English textile journal, assuming the truth of this proposition, propounds the following significant questions: "How is it, that with all the aid of steam and electricity, we still toil as hard as we ever did? Is it because steam and machinery do not perform more work than could be performed by hand?"

These questions, as it seems to us, puncture the present industrial problem in England and in this country. The theory so generally accepted by the under-consumption reasoners, that production is the only source of wealth, is true only so far as it relates to such products as are in demand, and for which consumers have something of an equivalent value to give in exchange. Whatever exceeds this is manifestly not a source of wealth, but an expenditure of capital and labor which impoverishes because it brings no remuneration. The ability to consume and to pay for what is consumed, is the measure and gauge of legitimate production, and whatever exceeds this is overproduction. This has been illustrated in thousands of instances in every period of business stagnation. Manufacturers close their factories for a time to enable demand to catch up with the product; or, when this is not done, the desperate attempt is made to decrease the cost of the product sufficiently to cover the reduction in margins, which is only another way of hiring the customer to buy a thing because he thinks it is cheap, and not because he needs it, thus increasing the overproduction.

The only way to relieve a glutted home market is to lessen production or find new markets for the surfeit. To dispense with machinery, or to stop making new and improved machinery, is out of the question. The world is not going to gravitate backward. The enormously augmented transportation facilities afforded by railroads and steamships have opened up markets in regions otherwise inaccessible, and this process is bound to continue indefinitely, or until the climax is reached when machinery, steam, electricity and whatever new forces and instrumentalities are yet to be developed, shall have done their perfect work by putting an end to competition. Machinery in England supplies the people of that overpopulated country with comforts and luxuries innumerable that were unknown under the Tudors and Stuarts; but England's productive power long ago exceeded the home demand, and the surplus products have to be distributed over the world. This process must needs go on, not only in respect to England, but the United States and other great centers of productive industry.

The bearing of the above upon the present business outlook in this country must be obvious. The improvement which began early in the autumn is evidently a legitimate one, and will continue until the equilibrium between the two great factors of production and consumption becomes unsettled by a boom or a panic. Which it will be, or how soon it will occur, cannot be calculated, like the next eclipse of the sun, with mathematical certainty.

THE WARMING OF STREET CARS.

This subject has been and still continues to be a debatable one. The street car companies, as a rule, are opposed to the introduction of heating appliances in their cars, and for obvious reasons. Their patrons, however, seem to be more equally divided in opinion, and if the experience of the street lines in Brooklyn can be taken as a criterion, the majority of the people who travel on them are in favor of the heating, because it adds to their comfort when the winter temperature falls below the average. The companies very naturally take an opposite view, because heating apparatus, fuel and maintenance, involve additional expense and diminish profits.

Stoves were first introduced on some of the Brooklyn horse-car lines three or four years ago, and their use has since then been extended to all the lines in that city. With the exception of the new elevated road recently opened, these lines are almost the only means of transit for a vast population over the long avenues from the ferries to distant points, and if there is any dissatisfaction with the stoves on the part of the public, it is so slight as to find no public expression. These stoves are probably the best heaters that could be devised for the purpose. They are of a neat cylindrical pattern placed centrally on one side of the car, and occupying with their surroundings only the space allotted to one passenger. The pipe runs through the roof, and the stove itself is incased on each side and at the back with sheet zinc. Outside of this on each side is a handsome wood casing which protects those sitting in contact with it from any uncomfortable heat. Coal is used for fuel, and the fire is replenished at the end of the trips. There is no litter of ashes in the cars, nor that worse abomination, loose straw, to remind decent people of a stable. Stoves of the same kind are also used on the Third avenue surface line in New York, and box furnaces underneath the car bodies on the Second avenue line.

At a meeting of the American Street Railway Association a year or two ago, the subject of warming street cars was discussed, and all the speakers, with but one exception, vigorously opposed the practice, chiefly for sanitary reasons. A street car, it was said, was too small a vehicle to be warmed; stoves were a nuisance, and were only wanted by a "certain class who didn't know what they did want; they created noxious fumes and interfered with ventilation; and a heating furnace underneath the car presents an unsightly appearance, besides causing risk of setting the car on fire. One of the speakers, in his solicitude lest the health of passengers should be endangered by stoves, admitted that a car in severe weather might be very cold at starting, but would become warm enough before the end of the trip by the crowding in of people, and that the warmth of a stove in addition to this would cause windows to be opened and every body would catch cold. This method of warming a car by crowding people into it, and utilizing the animal heat derived from respiration and skin exhalations, reminds one of the hotel guest who ordered a chop for breakfast, and when it was brought to him complained to the waiter that the plate was cold. "Yes, sir," said swallow-tail, "but you'll find the chop will warm it up very nicely, sir." One speaker, however, a representative of a street line in Rochester, was emphatic in his approval of the system of warming cars, and said that on his line it had increased travel considerably, and that the people were delighted with it. The ventilators were always open, and the air in the car was constantly changed. Mr. Hazzard, the president of the association, regarded a stove in a street car as a nuisance, but admitted that in Brooklyn the stoves had come to stay. The people would have them, whether healthful or not, and the lines could not get along without them.

There is hardly any question that the warming of horse-cars in this climate is very generally acceptable to the public. The cars of the elevated roads in New York are warmed the same as those on steam surface roads; and although they run three or four times as fast as horse-cars, a proposal to run them cold would raise a universal protest. All that is required in street cars is warmth enough to take off the chill, and the small stoves used on the Brooklyn lines are the best for that purpose. They are the cheapest in first cost, the most economical in fuel, and the most easily regulated of any other plan that has been tried. If a car gets too warm, it is only necessary to open the roof ventilators and the heated air rushes out like gas from a balloon, carrying the accumulated impurities along with it in case the car is crowded. A stove, in fact, is a good ventilator because it forces ventilation, and in addition to this, it neutralizes the moisture in wet weather, keeps the car drier and of course more comfortable and wholesome for its occupants. Some trouble will be experienced in adapting the fire in the stoves to the varying outside temperature, but this trouble is not a serious one and is easily avoided by careful and intelligent attention.

AUTOMATIC FREIGHT CAR BRAKE SENTIMENT.

Western railroads are leading those of the East in the application of automatic brakes to freight cars, just as they took the lead in applying the continuous brake to passenger trains ten years ago. When the change was being made to equip passenger cars with a reliable power brake that would give the engineer entire control of the train at all times, public opinion kept forcing forward the movement, and many railroad companies made the change without having any faith in power brakes being an improvement. They were looked upon by many as expensive appliances that theorists were forcing upon practical men by the force of newspaper sensations. The class of railroad officers that regarded continuous brakes for passenger trains in this light, are now raising objections of like cogency against the introduction of automatic or continuous brakes for freight equipment. There is no strong public opinion in this instance to urge them out of the beaten track they like so well to tread, so they will move exceedingly slow in making the change, but after it has been effected, the most conservative of men among them will look back and wonder how they ever were able to operate freight trains with the old hand-brake.

Every freight train equipped with continuous brakes is an eloquent traveling advocate for other freight trains being put in the same condition. The experience of roads that have freight cars fitted with different automatic brakes indicates that the cost of maintenance is much lower than was expected. On some roads the saving of the expense incurred through accidents alone is sufficient to pay for the maintenance of the automatic freight car brakes; so that the acceleration of business resulting from their use is clear gain. A prominent Western railroad officer, talking on this subject the other day, said: "We have found that automatic brakes enable us to stop a heavy freight train, at the option of the engineer, in just about one-third the time and distance that it can be done under similar conditions with hand-brakes and a crew of men. For instance, we stopped a train with the automatic brakes in 29 seconds within 752 feet, and in making the test the same train on the same grade with five men standing at the brakes ready for the signal, the best they could do was to stop in 76 seconds and 2,150 feet. Under ordinary circumstances, the men would be in the caboose, and longer time would be wasted in making the stop. The point in this improvement is, that freight trains can be run at treble their present speed and still be under perfect control." That sort of talk is very common among Western railroad managers, but somehow Eastern men are slow in taking up the theme. Till all leading roads agree to adopt automatic brakes, the enterprising roads now ready and willing for the change cannot make it to any advantage.

A BLISTER.

The letters we have published from master mechanics in all parts of this country and Canada about material for locomotive boilers and fire-boxes show plainly that there is a great deal of trouble in getting sheets to stand in regions where the feed-water is charged with lime. The testimony goes to prove that steel plates, although by no means satisfactory, give better service than iron. This conclusion has not been arrived at by many master mechanics without painstaking trials with different material. Among those who desired to prove for themselves whether or not good iron was preferable to steel, was Mr. R. W. Bushnell, of the Burlington, Cedar Rapids & Northern Railway. To test this by careful experiment, in May last he put in a fire-box side sheets of Tennessee iron. We mentioned that as an item of news shortly afterward, and immediately the *Railway Register*, which is out out of balance in its abuse of steel, began to proclaim to the world that after painstaking trial, steel had been discarded by Mr. Bushnell in favor of good iron. Our contemporary was too impulsive in the manner it shouted, for the iron pet it loves so well to fondle was not clear of the wood. The fire-box was put in, as we said, in May, and by the middle of July a huge blister had developed in one side sheet, so that a piece about seven inches square, that took in four stay-bolts, had to be cut out and a patch put on. To the average mind, that will not be regarded as a strong recommendation for iron as fire-box material, but we have no doubt that our St. Louis friends will derive intense satisfaction from the circumstance, and use the failure as a conclusive argument that steel must go. We believe so, because they pretend to derive great enjoyment from the master mechanics' letters we published. There are certainly individuals of the Uriah Heep type, who seem to enjoy being kicked, and we suppose that there are papers that hold similar sentiments.

COMPOUND LOCOMOTIVES FOR AMERICA.

Mr. G. C. Hawkins, mechanical engineer, Boston, is trying to make arrangements to introduce the Webb compound locomotive to the railroads of this country. From Mr. Hawkins we learn that Mr. Webb has 30 engines at work with high pressure cylinders 13 inches, low pressure cylinder 26 inches diameter, and all 24 inches stroke; 10 engines have high pressure cylinders 14 inches, low pressure cylinder 30 inches diameter, all of 24 inches stroke. There are 20 more of still larger size under construction in the works at Crewe, England. One of the compound engines, from July to the middle of September, ran 21,658 miles, being worked by two sets of men. They used about 27 pounds of coal per mile, against 34 pounds on 16 × 24-inch common cylinders, with same size of boilers exactly. That mileage is regarded as something wonderful in England, but many American locomotives have made over 10,000 miles a month and no talk made about it. Still, we would like very much to see a Webb compound running on an American railroad, for we could then make intelligent comparisons between the economical value of its work and that of ordinary American locomotives. Should Mr. Hawkins succeed in putting one of these engines upon an American road and it prove very economical in the use of coal, if the difference should be as great as that represented to exist between, say a Pennsylvania Railroad locomotive and the compounds running on the London & Northwestern Railway, there would be material inducements for many of our railroads to adopt that form of locomotive. The cranked axle would be the main objection to the engine, but these axles could run just as well on many American railroads as they do on English roads. A crank axle is not a desirable thing about a locomotive, but it presence would not prevent American companies from adopting the compound engine if sufficient inducement were presented in the way of coal saving.

RAILROAD ELECTRIC MOTORS.

The Daft electric motor has been on the Ninth Avenue Elevated Railroad track, of New York, for about three months, and at protracted intervals during that time has been taken out for a run over the road. It has moved two or three empty cars at speeds that reached about twelve miles an hour. Very little has been said in New York about the performances of this motor, but the reading public of other cities have been frequently regaled, through the Associated Press dispatches, with glowing accounts of the success of the motor. If it were now operating full passenger trains with an ease and regularity that left steam locomotives far behind, and were doing the work with less expenditure of coal, the accounts of its success could not have been proclaimed with greater confidence and satisfaction than they have been when it merely demonstrated that it could move along an ordinary track. The Daft electric motor on the New York elevated railroads has not done one-hundredth part of the work performed by the electric motor that was run round the gallery of the exposition building when the Railway Appliances Exhibition was held in Chicago two years and a half ago. When the advocates of using electric motors for operating the elevated railroads first began to push their schemes, they insisted that roads of that kind could be operated more cheaply by electricity than by locomotives, and they were free with promises that the fact would be demonstrated as soon as an electric motor was got ready. One motor has been ready long enough to show exactly what it could do, but instead of inviting the engineering world to witness the motor's operations and examine the power required to do the work of running two or three empty cars, the parties controlling the machine have been intensely jealous lest any unauthorized persons should have the means of looking closely to the work the motor was doing. It has been repeatedly demonstrated to the satisfaction of every man able to judge, that it would cost more for fuel alone to operate elevated or any other roads by electricity than it would to operate them by locomotives, and there is good reason to believe that the owners of the electric motor now being played with are perfectly aware of the fact. Every day makes it more evident that operating the elevated railroads is not so much desired as operating the stock in electric motors.

OUR TIMBER RESOURCES.

At the meeting of the American Forestry Congress, in Boston, in September last, the President of the Association delivered an address in which he presented some very startling estimates in reference to the existing timber resources of the United States. Considering the source from which these estimates come, the inference would seem to be warranted that they are fairly reliable, and that the deductions therefrom are approximately correct. The detailed estimates of timber consumption are given with a good deal of particularity, and if forest denudation keeps on at the present estimated rate, the forest area of the country will be swept clean in a little more than eight years. This astounding result is arrived at, omitting details, as follows:

The entire forest area of the United States and Territories, not including Alaska, is now in round numbers 441,000,000 acres, and the annual decrease of this area to supply the demand for consumption for all purposes, including the quantity of timber destroyed by forest fires, is in round numbers 50,000,000 acres; and as nothing is said about new growth, the inference is that that goes with the rest. So it seems that within another decade, if this remorseless consumption is not checked, the only timber trees that will be left in this broad land will be merely ornamental ones to shade our city parks, roadways and rural homesteads. We have no data of our own with which to prove or disprove the correctness of these estimates. In spite, however, of the highly respectable source from which they emanate, we cannot but think that they are very much exaggerated as respects the apprehended forest destruction. If they do really reflect the truth of the situation, the apathy of the government and all the multitudinous business interests of the country in the face of such a calamity and the nearness of its approach, is, to say the least, very extraordinary. The truth is, that while serious inroads are being made every year upon our timber resources, nobody with level heads believes they are going to vanish out of sight in eight years or in forty years.

If railroad men believed it, the agitation of the metallic tie question would be more earnest and wide-spread than it is, greater attention would be given to the matter of metallic cars, speculators would lose no time in starting a tremendous boom in lumber of every description, and toothpicks and shoe-pegs would be at a premium. After all, if the worst is to come almost as soon as a first-class white-oak cross tie, put in the track to-day, is worn out, we shall have Canada and Mexico to fall back upon, these countries not being included in the eight-years' theory. And besides, a good deal of tree-planting is likely to be done west of the Mississippi River and elsewhere, the probable extent of which may be inferred from the statement made by ex-Governor Morton, of Nebraska, at the meeting of the Forestry Congress, that there were now 700,000,000 trees planted by human hands in the State of Nebraska, where a few years ago there were no forests at all.

We would direct the attention of railroad officers having charge of color-blind tests for trainmen, to a letter in another column relating a case of temporary color-blindness. Other cases of this kind may have occurred with the result of inflicting injustice on men whose vision is sound under ordinary conditions. It is very important that men who suffer from defective vision should be prohibited from occupying positions where their misfortune may cause disaster, but we are sure it is not a fair test to require a man to match colored yarns a few minutes after he has been cleaning a locomotive fire, and we do not believe that the officers of any road would willingly perpetrate the injustice that might be done to a man by requiring him to go through the test at such a time.

IOWA RAILROAD COMMISSIONERS ON AUTOMATIC CAR COUPLERS.

The Master Car-Builders' Association have deprecated the action of State railroad commissioners in meddling with car coupling matters, but this does not appear to deter railroad commissioners and State legislators from moving in the direction of making the adoption of automatic car couplers compulsory on railroad companies. The railroads west of Chicago have done practically nothing with automatic car couplers so far, but the indications are that many of them will soon be constrained to do something toward stopping the fearful "holocaust," as a contemporary denominates the annual loss of life in coupling cars.

By a private letter from one of the Iowa Railroad Commissioners, and advance sheets of the Commissioners' reports for 1884 and 1885, we learn that the Iowa Railroad Commissioners recommend the Legislature to pass the enactments necessary to make the adoption of automatic car couplers compulsory on railroad companies in that State. As the Railroad Commissioners named are a board of very able and influential men, as their views are usually accepted by the legislators as eminently practical and worthy of the highest consideration, there is every reason to believe that the recommendations of the reports will be followed.

The Commissioners make out a strong case. They say that during the thirteen years' existence of the Board there have been reported 108 persons killed and 665 injured while coupling cars in Iowa. They refer to the fearful slaughter from the same cause that is going on in other States, and say that this has concentrated the inventive genius of the age upon some method by which cars can be coupled and uncoupled without going between them, that master car-builders and railway journals have been discussing the subject for years, and that eventually the General Assembly of Massachusetts passed a law requiring all railroad companies in that State to equip their freight cars with automatic couplers. Particulars of the Massachusetts law are given and the Commissioners hope that the action of Massachusetts in this matter will be followed everywhere either voluntarily or by compulsion. It seems fitting, they continue, that there should originate a reform in one branch of railway service that will save annually the lives of hundreds and the crippling of thousands of active, vigorous young men, at the period of life when their personal services are the most valuable. In the letter we referred to the Commissioner expresses the belief that the Iowa Legislature will pass a law similar to the Massachusetts law, only modifying some of its features to suit circumstances. Almost all the Iowa lines of great importance begin outside the State, and, crossing Iowa, run into other States, so that the couplers to be used will not, the writer believes, be prescribed by direct State authority, as in Massachusetts, but they will be required to use some automatic coupler.

The Iowa Railroad Commissioners strongly favor the adoption of power brakes for freight trains, and although they do not recommend legislation for that at present, it is evident they will not wait many years before doing so, unless railroad companies show a disposition to render legislation unnecessary.

SAFETY AND AUTOMATIC CAR COUPLERS.

On page twenty-four of this report is given the number of accidents caused by going between cars to couple and uncouple them. It is not a pleasant thing for the Commissioners to report year after year this sickening array of facts. They feel that this frightful maiming and killing of men should no longer be allowed to go on without an earnest protest from this Board, and an urgent appeal to the legislature for some action that will hasten the day when railway companies shall be required to adopt some safety or automatic device that will no longer necessitate the going between cars in order to couple or uncouple them, as is the practice now, and from which so many accidents result. It is gratifying to be able to recognize the fact that not only is the public mind becoming aroused upon this matter, but the railroad companies are moving in the direction of securing some practical safety device so as to avoid this fearful loss of life and limb that has saddened the entire railroad history of the country. Inventive genius has already brought out and patented over 3,500 car couplers, and many of these have been urged upon railroad companies for trial. The National Master Car-Builders' Association in their annual and other meetings have spent much time in discussing the merits of many of these. This Association of Master Car-Builders is composed of the able mechanics and superintendents of motive power of the leading railroad companies of the nation. Among them are probably as able practical mechanics as can be found. Year after year these men have discussed this question of automatic and safety car couplers, without being able to come to any definite conclusion as to which is the best one, or the best two, three or four. In the minds of this Board there are very great doubts about any definite conclusion ever being reached by these men. The very fact of the great and superior mechanical ability of the many men who compose the membership of this association is of itself the reason why they may never unite on any one, two, or any three of the couplers brought out.

Each man has his own peculiar and particular ideas as to what the perfect coupler should be, and is so well able to fortify these views by solid reasoning that he will not readily if ever yield them for those of his fellow member and mechanic. His pride of opinion will not hold him aloof from accepting the views and opinions of another. In the third week of last September there was had a testing of automatic and safety car couplers at Buffalo, New York, under the auspices of the National Car-Builders' Association, which was witnessed by a member of this Board. There were on exhibition some fifty different couplers, but as the published rules for the test required that at least two cars should be rigged with each coupler entered for the test, there were only forty-six which complied with the rule and were tested. A committee of twelve selected men—experts—from the association had charge of the tests. This was most faithfully, patiently and impartially done, occupying three days' time. After the three days' trial, the committee went into session by themselves, the railroad commissioners from the several States alone being invited to listen to their discussions on the relative merits of the couplers tested. After long and very elaborate discussion the list of forty-six couplers was voted down to twelve. These twelve were to be put on probation, some one railroad company agreeing to put fifty of one kind on its cars, another company fifty of another kind, and so on through the twelve couplers. They were to keep an accurate record of the work of each for the next six or eight months, or until the next annual meeting of the association, when the relative value of each would again be canvassed from the record of its work in actual every day practice. It was freely admitted on the floor of that committee room by the representatives of the railroad companies in the persons of their ablest mechanics, that while it was due to the train men to adopt *at once* some of the devices that would save so many lives and such great suffering, still, unless the legislatures of the several States should by law require the adoption of some one or some small number that could with safety be coupled with each other, it might be a long time before the railroads themselves would voluntarily fix upon and adopt any one, or any two or three. The tests made at Buffalo went far enough to show *conclusively* that there are already perfected devices that can be applied to cars at a very moderate expense, which would do away with most of the danger now so imminent to trainmen under the present method of coupling cars, and we cannot refrain from urging upon the Legislature the imperative necessity of such action as will insure the speedy adoption of some one or more of these safety devices, in place of the dangerous couplers now in vogue.

AUTOMATIC OR POWER BRAKES FOR FREIGHT CARS.

Equalling in importance an automatic or safety car coupler is an automatic or power brake for freight cars. If the same ratio holds between the numbers killed by falling from trains and those by coupling cars in other States as exists in Iowa, the number killed each year from this one cause is appalling. For the years 1882, 1883, 1884 and 1885 the number killed in this State from coupling cars was fifty-three, falling from trains ninety—nearly twice as many. The fatality of the accidents of falling from cars is much larger than that from coupling cars. In an elaborate editorial article in the *Railroad Gazette* of September 18 and 25, 1885, it is shown from reliable statistics that there are killed in the United States annually not less than 459 persons, 4,080 seriously injured, and 13,770 injured, but not, in railroad parlance, "seriously." The taking off of part of a hand, a finger or thumb or two or three fingers is not reported as a *serious* injury.

Here are fatal and painful accidents, yearly amounting to the vast number of 18,309, an array of figures that is absolutely appalling, and all from the one cause of coupling cars. Now, if as said above, the same per cent. holds in other States as here in Iowa between those killed by coupling cars and those by falling from trains, there are not less than 760 men in the very morning of life, when life is worth the most to them and to those dependent on them, sacrificed to this other cause alone, viz.: falling from trains.

How fearful to contemplate is this long list of fatal accidents, and how terrible the reality! That men, that human beings should be compelled to go at all times of the night, in all kinds of weather, from one end of fast moving trains to the other on top of the cars, no matter how bitter the cold, how blinding the storm, how violent the wind, how icy and slippery the decks of the cars, or however great the peril, is a species of inhumanity that should not be tolerated among civilized people! Human life is too sacred a thing to be so trifled with, and put in the balance against a few dollars and cents. There is really no more necessity for continuing the present practice of using hand-brakes on top of freight cars than there is for putting men on the tops of passenger trains. At Buffalo during the car-coupler trial it was the unanimous opinion of every master car builder who was conversed with upon the subject that it was only a question of time when all freight cars would be equipped with some automatic or power brake, as are passenger cars. It was also the invariably expressed opinion that railway companies could not afford to do without them. "Time," it was said, "is now a very important factor in the competition for freight traffic." Freight trains must be run on much quicker time than in the past, but this could not be done with safety, only as the cars were equipped with some kind of brake, to which the power of the engine could be applied. Still, with all these admissions by railway men, the desired improvements will be long delayed, unless legislation shall limit the time when this danger to train men must cease.

From and after some specified date, *and that in the very near future*, every freight car should be equipped with some kind of an automatic or power brake, and a heavy penalty imposed on any company which compelled its men to use a brake that exposed them to the danger inevitably consequent upon the use of the hand brake now common. Since writing the above the Commissioners have had occasion to investigate a serious accident occuring on the Burlington, Cedar Rapids & Northern Railway on the night of the 30th of October, 1885. A wild freight train loaded with stock was ordered to make not less than an average of twenty-five miles an hour from Albert Lea to Cedar Rapids. The accident occurred at Northwood, Worth county. From the "speed record sheet" it appears that the train made an average of thirty-two miles an hour from Albert Lea to the place where the accident occurred. The engine left the rails at the first switch coming south at the station. The speed at this point was nearly twenty miles an hour. Had the cars been equipped with brakes under control of the engine, the speed could have been checked down to that demanded by the rules of the company—namely, six to eight miles an hour in passing switches and stations. As it was, the heavy train, consisting of twenty-seven cars, was not under proper control, because of the inability to keep control at all times by hand brakes, where trains are required to run at such high rates of speed. Here two lives are sacrificed; two young men, the engineer and one of the brakemen, were instantly killed, and the fireman badly scalded, a great amount of property destroyed, some twenty-seven cattle killed and others injured. The loss of property in this one accident would, if it could have been saved, go far toward equipping the company's cars, with some kind of automatic brake. *Between the values of the lives of these two young men and the cost of the brakes by which in all probability they could have been saved, there can be instituted no comparison.* No general manager, no president or superintendent of a railway company, no stockholder, or director, would for any sum of money risk his life as these brakemen hourly and daily risk theirs. To them life is just as dear, and just as important to their families as are the lives of the former. The fact that trains of cars are run with almost perfect safety to trainmen, because of the use of air and other automatic brakes, and this other fact that with the use of the common hand brake there is every year a fearful loss of life, as well as of property, and a great amount of suffering—these facts, we repeat, are sufficient to warrant legislation that will require railway companies to adopt such appliances as will prevent this loss of life and property, or rest under a heavy responsibility for the same. We as Commissioners, cognizant of these facts under oath to do our duty to all parties interested, most earnestly call the attention of the law making power to this unnecessary loss of life, and plainly ask if the public will hold the legislature blameless, unless it promptly provides against the further continuance of this great wrong.—*Eighth Annual Report.*

LABOR STRIKES are self-imposed idleness, and in those exceptional cases where the advance in wages is conceded, the advance rarely remunerates for the time lost and the incidental expenses incurred in maintaining the strike. The result is dead loss to strikers and employers; and when the strike is unsuccessful, the loss to those who participate in it is without any compensating advantages whatever, unless a brief period of needed rest from wearisome toil purchased at a higher price than the strikers can afford to pay for it may be so regarded. Yet, organized strikes have become a feature of our industrial progress. The only preventive would seem to be arbitration, a method which in theory is excellent, but more difficult to carry into practice in labor strikes than in the settlement of national disputes, for the reason that the striking parties either lose their wits or surrender their judgment to the dictum of short-sighted or self-seeking leaders. Arbitration implies a mutual agreement to abide by the decision of disinterested parties qualified to weigh the right and wrong of the matter and strike a just balance between them, and the difficulty lies in bringing about such an agreement, which, of course, must be voluntary and not by force of legal compulsion.

THE article on the Optics of a Railway Signal Lamp, by T. A. Lawes, which we publish elsewhere, is an interesting description of a method devised by Mr. Lawes for testing lamp lenses of different shapes and qualities to prove which kind transmitted the strongest light. The subject is one in which many railroad companies ought to be more interested than they appear to be. As the safety of trains depends in a great measure on signal lamps emitting a strong penetrating light, all companies ought to be certain that the light is not obstructed by defective lenses. The method of making tests which Mr. Lawes so clearly describes, can be followed by any intelligent employé selected for the purpose. Carrying out the tests entails the purchase of no expensive apparatus, so there is no reason why every railroad company interested in preventing accidents should not have their signal lamp lenses tested before being put in service.

STEAM MOTORS for operating street railroads do not appear to attain any popularity, even in the small towns where their use might be regarded as highly practicable. A street railroad in Dubuuqe, Iowa, was opened some years ago, and steam motors were put upon them, but they proved an utter failure. They were too heavy for the track, and suits were brought against their owners for frightening horses and for causing a nuisance by raising smoke and blowing off steam in the public highways. The result was that the motors were taken off and horses substituted. A street railroad was recently completed at Moline, Ill., and the company wanted to try the steam motor style of operating, but the city authorities ascertained the experience of Dubuque with that kind of motor, and refused to grant an ordnance permitting steam motors to operate in the streets. The festive mule now rules supreme in giving motive power to that railroad.

VERMONT has joined the onward march of civilization. The star of empire which has for a number of years been monopolized at the West, is to be lured back to its starting point on the eastern shore of Lake Champlain. A street car line, the first ever built in the State, was formally opened the other day in Burlington, with demonstrations suited to the importance of the event. Bands of music, speeches, rockets, Chinese lanterns, illuminated stores and dwellings, and a decorated car drawn over the line by six mules, gave significance to the occasion. It must be said, however, that the success of the enterprise was largely due to local rivalry, the citizens of Burlington having heard that a similar project was on foot at Rutland, which is only a village, with Selectmen and fence-viewers, while Burlington is a city, with a Mayor and asn-inspector.

THE latest phase of the car-coupler problem is a notice served by a Nebraska inventor that he understood the time of the Buffalo tests was to be in October instead of *November*, and that in consequence of this mistake he missed the opportunity to complete and show off the best coupler ever invented. But he now publicly challenges the *fifteen* couplers selected to a public competition, and gives them the comforting assurance that they will come out badly vanquished.

MR. C. W. SMITH, who recently resigned the position of General Manager of the Chesapeake & Ohio Railroad, was a most popular railway officer. It is said that Mr. Smith, when the ten per cent. reduction was made on the Chesapeake & Ohio, assured the committee of engineers that wages would be restored at a certain time, and finding that he would be unable to carry out his promise, owing to matters which he could not control, resigned. Whether this last statement is true, however, is not known, but those best posted say that he has resigned to accept a similar position with another company. Mr. Smith was a universal favorite with the employés of the company, all of whom will regret his going.

THE anti-friction rollers have again twisted themselves through the patent office as a car-axle bearing. The victim attached to them this time was Peter Cool, of Manhattan, Kansas. He proposes using a large roller supplemented and reinforced by several small ones. If Peter is possessed of much worldly goods, he can dissipate them very readily by means of this invention. If he is poor, his arrangement of friction-rollers is born to blush unseen.

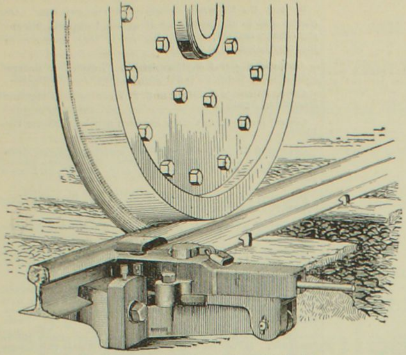


Fig. 1.—Perspective View of Signal in Position.

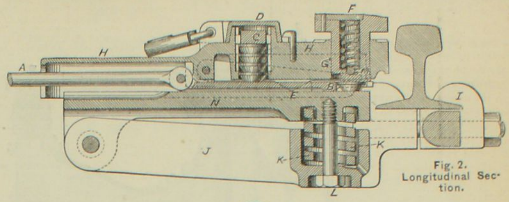


Fig. 2. Longitudinal Section.

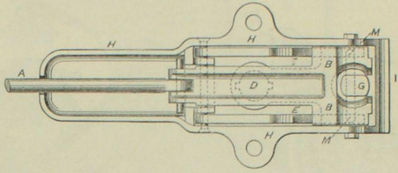
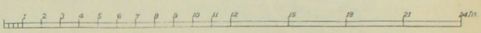


Fig. 3. Inverted Plan of Upper Portion above E, Fig. 2.



THE PALMER TORPEDO SIGNAL FOR RAILWAYS.

The mechanical details of the apparatus are very clear from the engravings. The rod *A* is connected with the actuating mechanism, whatever and wherever it may be, by usual devices, so as to give a horizontal movement to the slide *B B*, Figs. 2 and 3, of 5¼ in. A locked reservoir, protected by a cap *D*, is filled with torpedoes, the latter being loaded with a light weight *C*, to prevent their catching or turning over. The engravings represent a torpedo in position to explode. It is exploded by a wheel rolling over the anvil *F*, when experience has shown that all the fragments of the casing are blown completely out of the machine. Whether it be exploded or not, when the necessity for the signal has passed, the slide *B* is moved backward so that the torpedo at *B*, Fig. 2, or the annular opening in the slide *B* to receive it, is directly under the torpedo magazine *C*. If the torpedo has been exploded, another drops into place in the slide. If it has not been exploded, it remains in position as before, as do also the surplus torpedoes in the magazine, and may be moved backward and forward an indefinite number of times.

In advancing the slide from its inactive position (not shown) to that shown in the engraving, the front part of the slide *B B*, Fig. 3, engages with the beveled projections *E E* of a cam-lever, causing them to lift in front (the rear end of the lever being pivoted as shown), and raise the pin *M M*, and with it the exploder or hammer *F*, so as to permit the torpedo to pass beneath it, when the formation of the parts is such, as will be seen, that the exploder is gently lowered again to a bearing on the torpedo.

The exploder *F* is now supported by the torpedo at a level of ½ in. above the level of the rail, so that any wheel must drive it down and explode the torpedo, but if no wheel passes, the latter is readily withdrawn.

Should the signal at any time be raised or moved half way and remain in that position, the slide would raise the exploder and the cams rest on the slide. To prevent the pin *M M* or the cams *E E* from being bent or broken, a slotted hole is made in the exploder *F*, through which the pin *M* passes. A spring within the exploder rests on the upper side of the pin *M*, holding it firmly against the bottom of the slot, as shown in Fig. 2, but the spring can be compressed when the cams are resting on the slide, as the pin is free to move in the slotted hole, thereby permitting the exploder *F* to be pressed down without injury to any part of the machine. The spring is held in place by a piece dovetailed into the exploder, as shown at *F*.

The lower portions of the apparatus *J*, *K*, *L*, Fig. 2, which includes about half its weight, is solely designed to avoid the danger of fracturing the apparatus by some locomotives in use, which have, unfortunately, badly worn tirers, with the outside portion of the tread extending more or less below the level of the rail, so as to form a "double flange." It will be seen that the entire working part of the machine is carried within the casings *H* and *N* and pivoted as a whole to the arm *J*, Fig. 2, at its rear end. The front end is supported by the very stiff and powerful spring *K*, the bolt *P* holding the top of the machine in place. The spring *K* is stiff enough to be unaffected by the force needed to fire a torpedo, but when a worn wheel passes over the machine it yields enough to prevent breakage. Oil holes are placed on each side of the magazine, so as to be in full view when the locked cap is removed.

The chief danger to which any apparatus of this kind at the level of the rails is exposed is from ice and snow; but it is claimed that the design of the machine, by which all working parts are enclosed and protected, is such as to render it practically proof against this danger, with the moderate attention in very bad weather or at much exposed localities which anything of the kind must require.

The device is manufactured by the Palmer Torpedo Railway Signal Co., of No. 41 Pine street, New York. Its extreme dimensions are about 18 in. × 6 in., and its weight about 75 lbs. The first placed in use were four machines at Chatham Square station, on the Manhattan Elevated Railroad, and twenty-five more have since been ordered for use on other parts of the Elevated lines. It is also in use at points on the Long Island Railroad and the Delaware & Hudson Canal Co.'s Albany & Susquehanna line.

MAHOGANIZING MAHOGANY.

The practice of deception in the manufacture of articles of luxury and adornment by means of surface imitation, giving them an apparent quality and value which they do not possess, has long prevailed in the arts. It has long been a feature of cabinet furniture of the cheaper grades. There is and always will be a market for such wares, because great numbers of buyers can not afford to pay for what is genuine and intrinsically excellent, but are willing to take the next best thing—a good imitation which can only be detected by experts. The manufacturers and venders, in a purely business point of view, can not be justly blamed for supplying the demand for goods in their line. Indeed, the force of competition makes it unavoidable so long as there is no concerted action by the trade against pandering to such a perversion of good taste.

The supremacy of mahogany as the king of cabinet woods has long been conceded, and it is not likely that it will ever be supplanted by a successful rival. Sometimes, but not often, it goes out of fashion for a brief period, as it did some twenty years ago to make way for the black walnut craze. But it did not stay long under a cloud, the importations increasing from half a million feet in 1874 to ten millions in 1884. In one respect it has an advantage over almost all other woods. Its beauty, instead of deteriorating, increases with age; it does not shrink, warp or check, and the peculiarly rich tone of mahogany furniture made fifty years ago can be acquired only by the lapse of time, and time is therefore an unavoidable element in the price of the product. Furniture that has thus been enriched and beautified by age is called "antique," a term which hightens the charm and intensifies the desire for its possession; and manufacturers, in order to profit by the rage and serve their customers, have resorted to a process of staining new mahogany, or toning it up as it is called, so as to counterfeit the appearance of age and give an antique effect to the new wood, the furniture being real mahogany upon which no deception has been practiced except to make it look older than it really is.

But like most other manias, the antique craze is subsiding, either because the price, as a rule, is an infallible index of what is real and what is spurious, or because reputable manufacturers are not disposed to encourage deception. Rosewood, the nearest rival of mahogany, is also subjected to the staining process, which robs it of its natural beauty when new, to make it salable. Whatever in esthetic adornment pretends to be what it is not, and to have cost what it did not, is a cheat, an imposition and a lie; and in cabinet work, in architectural construction and kindred things, it is always better to let the material speak for itself, whether it is mahogany, new or old, rosewood, cherry, oak or what not. Painted surfaces are not objectionable except in so far as they are intended to deceive by a close imitation of something better than what the paint covers.

Much credit is due to Mr. F. J. McAvoy, the editor and publisher of the *Furniture Trade Review*, of New York, for his persevering efforts to enlighten the public in the matter of staining fine cabinet woods, so that buyers may improve their tastes and discriminate between what is genuine and what is bogus, and manufacturers be relieved at the same time from a practice closely allied to trickery.

Our friends of the *Mechanical Engineer* have reason to be proud of their number issued on Nov. 28. It contains a supplement with four fine illustrations of the engines of the United States cruiser Chicago, besides even more than usual letter-press attractions. It is a bright, newsy journal got out by men who understand what they are writing about. We are gratified to perceive evidences of its growing prosperity.

Mr. William H. Paige died in Cleveland, O., Nov. 14, after a short illness, aged 44 years. Mr. Paige was born in Vermont, but early settled in Springfield, Mass., and after learning his trade entered the employ of the Wason Car Co., in whose service he remained for 22 years. Some years ago Mr. Paige invented the steel-tired car wheel, which is known by his name, and shortly afterward formed the Paige Car Wheel Co. Some two years ago the works of the company were established in Cleveland, and in order to superintend them Mr. Paige left the Wason works and removed to Cleveland.

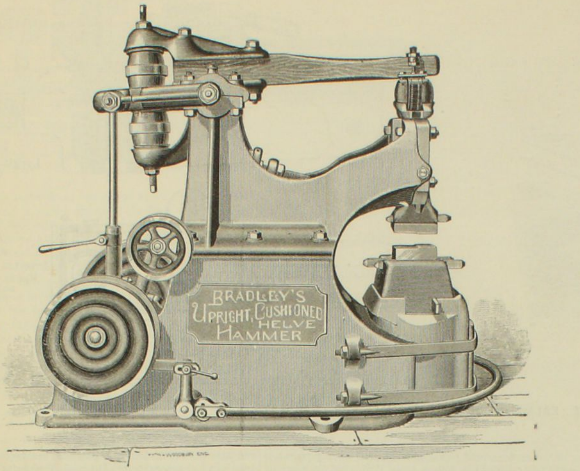
N. W. Ayer & Son's American Newspaper Annual for 1885: This volume contains a list of all newspapers and periodicals published in the United States and Canada, with information in regard to their circulation, issue, date of establishment, advertising rates, and population of the cities and towns in which they are published; also a separate list of all such publications which insert advertisements, arranged alphabetically by counties and geographically in States by sections, giving location, area, natural features, chief products manufactures, population, etc. The usefulness of such a work as this depends, of course, upon the care with which it is compiled and its freedom from errors. Of its quality in these respects our means of forming a judgment are very limited, but its general arrangement and clean typography are certainly very much in its favor, and we have no hesitation in recommending it as by far the most comprehensive and complete work of the kind ever published in this country. Aside from its value as a guide for advertisers, it contains a great deal of incidental information, statistical, geographical, historical and political, which is of easy reference by means of an index, and the admirable arrangement of the matter. The pages are 4½ × 8 inch, exclusive of margin. The catalogue proper covers 746 pages and 250 additional pages are occupied with newspaper advertisements. Published by N. W. Ayer & Son, Philadelphia.

We have received a circular announcing that a General International Exhibition of Navigation, Commerce and Manufacture will be held at Liverpool, England, commencing May, 1886, and closing October, 1886. The exhibits will embrace models of ships, docks and lighthouses, traveling conveyances, machinery in motion, staple articles of manufacture, minerals, etc., etc. Messrs. L. W. Morris & Son, 20 Broadway, New York, have been appointed by the Executive Council of the Exhibition, to act as forwarding agents and representatives of American exhibitors.

Since the cable street railroad in Chicago was opened, there have been a great many improvements on the system patented, but the improvements do not run away from the original very fast. It was assumed that the gripping device was too cumbersome and heavy for Eastern refinement, so when the Brooklyn Bridge was provided with a cable road, a brand new grip was adopted, the production of the matured genius of New York. That grip was a shining success only in one way. It gave daily lessons of patience to the restless people of Brooklyn by its numerous failures to move the cars for half an hour after an attempt was made to start. The people of Philadelphia were above borrowing any part of the cable system from Chicago or San Francisco, so when they built a road in Market street, they adopted an original system entirely. It is being operated now the greater part of the time by the help of horses. On a recent juncture, the grip took occasion to vary its record by holding, and it held so well that the man in charge could not induce it to let go; so the car went tearing along like a Juggernaut vehicle, smashing every thing within reach. There are indications that the new cable road opened in New York will be a most uncertain means of getting around on, but the promoters of the company have the satisfaction of knowing that they succeeded in eluding the patents that cover the system of operating the older cable roads.

English engineers have begun to survey a preliminary line between Manitoba and Hudson Bay, to ascertain if a railroad could be built between these points at a cost within $25,000 per mile. Should they decide that it can be done, it is said English capitalists would advance the money to execute the work. They think that if the passage by the Hudson Bay route could be kept open for three months of the year, that a railroad between Manitoba and Hudson Bay would pay. We are afraid that English capitalists who put their money in such a scheme will receive the same kind of returns as others of their countrymen have received from far more promising railroad enterprises on the American continent, that never paid a cent on the money invested.

The depression of railroad business is exercising a most demoralizing effect upon the inventor of railroad appliances. The number of railroad patents is decreasing at an alarming extent, even new car couplers are becoming less numerous than they have been in any period for twenty years.



THE BRADLEY UPRIGHT CUSHIONED HELVE HAMMER.

THE engraving represents this hammer, as perfected by the manufacturers, Bradley & Co., Syracuse, N. Y. It is adapted for use on all kinds of forgings in general jobbing shops, in railroad car works, carriage factories, etc., including all kinds of die work.

The hammer is operated by an eccentric at the rear, connected by a pitman to the saddle or oscillator, which carries the helve. To this helve the hammer head is attached.

By the use of the rubber cushion employed with these hammers, the force of the blow is several times increased, but at the same time a degree of elasticity is maintained that prevents danger from breakage, and thoroughly cushions the jar, which is not perceptible in the working. By this means the blow is made to imitate the blow of a hand hammer; the hammer head gets away from the work almost instantly after striking the blow, thus avoiding chilling the work.

Every working part of these hammers is in full view of the operator, and the whole is of very simple construction. A friction sleeve on the pitman at the rear of the hammer permits the length of stroke to be instantly adjusted—a matter of a good deal of importance in doing a variety of work differing in size.

The arrangement is such that the keys holding the upper and lower dies are removed as well as driven in from the front. By the use of the friction sleeve, previously referred to, the opening or distance between the dies while at rest may be varied from actual contact up to six or seven inches in the smaller sizes, and twelve to fifteen inches on the larger sizes. In making these changes, no other parts require adjusting ; adjusting the stroke adjusts all other working parts.

These hammers are made throughout of the best material, and an important claim made for them is that they consume the minimum of power to operate. Several of the improved kind here shown have been in operation for more than a year.

THE finest railroad passenger station in New England, outside of Boston, will soon be opened at Concord, N. H. It is 218 feet long by 60 wide, and has an iron train shed connection 770 feet long by 105 wide. The general style, both inside and out, is English Renaissance. The foundation is of the finest local granite, in large blocks, and extends five feet above the grade, being "battered" where exposed, and presenting heavy rock-faced projections. In the superstructure, dark-red bricks are used, laid with dark joints, with dressed granite window sills and lintels, and also copings of the gable walls. Square pilasters, with dark-red terra cotta capitals at all corners, relieve the façade, and give stability to the structure. Exposed iron anchors of great strength connect all securely together. The roof has a steep pitch, and particular attention is given to the construction at the eaves in order to avoid damage by snow or frost. The eaves are overhanging, without gutters, while an iron frame awning projects on three sides over the walk, the east side being protected by the train shed. The roof is covered with first quality, dark blue slate, while all flashings are of heavy copper. At the center the building is divided into two wings by an open rotunda, 60 feet by 65, and 62 feet in height. The floor is of marble, laid over brick arches.

THE NILES TOOL WORKS, of Hamilton, Ohio, have issued a pamphlet of 30 pages, in which the Turning of Steel-Tired Car Wheels is elaborately discussed, the purpose of the writer being to distinguish the peculiarites of tire-turning from ordinary turning; also the various plans of procedure which will suggest themselves to the lathe men; the merits and demerits of ordinary turning lathes when applied to this kind of work; an analysis of the special forms of lathes proposed for the work; and a description of the special form which appears to be based upon logical deductions, and which practice indicates as the nearest approach to a correct solution of the problem.

THE firm of Gardner, Holmes & Co., manufacturers of perforated car seats and ceilings, has been reorganized under the title of Gardner & Co. The members of the firm are Messrs. William, John M. and Samuel H. Gardner, and the office and factory are at Nos. 643 to 957 West 48th street, New York city. The firm state that the demand for their goods is now fully 15 per cent. greater than at this time last year. To meet the increased demand they have enlarged the capacity of their works, now having 40,000 square feet of floor space, and entirely new machinery in every department.

MR. W. B. WILKINS (115 Broadway), the foreign representative of the Harlan & Hollingsworth Co. and several other leading manufacturers in the United States, has recently returned from South America, where he found railroad building very much overdone. The Brazilian Government has lately canceled the 6 per cent. guarantees on projected roads, but reimbursed some of the parties for work done on surveys, etc. There are two or three car manufacturers in South America that are turning out a very fair class of work, and English builders are supplying foreign roads with the American style of cars at very low prices.

FROST & PETERSON, of New York, manufacturers of perforated veneer seating for cars, railway depots, etc., have just issued a new catalogue of 56 pages, with copious illustrations of the application of their seating to different styles and patterns of chairs, settees, etc. Special attention is called to their three-ply veneer work, which is universally approved for its strength, beauty, durability and cleanliness, and is furnished in a variety of woods or stains to suit purchasers. The firm also furnish panels and head-linings for railway cars and other decorative work.

MR. A. L. ROWE, who has hitherto been the New York representative of the Pickering Spring Co., of Philadelphia, has recently been appointed General Manager of the Mississippi Glass Co., St. Louis, Mo. Our personal knowledge of Mr. Rowe's business ability and experience warrant us in saying that he will be found equal to the responsibilities of his new position, and that the company could not have selected a manager better qualified to advance the interests of their business.

THE NATIONAL PAINT WORKS, Williamsport, Pa., report that their business is better than for some time past, and that they are supplying their Asphaltum Paint to a number of railway and bridge companies. The new viaduct bridge at Cleveland, O., and the Seventh Street Bridge, at Pittsburgh, have recently been painted with it.

THE improved seven-inch planer and matcher, got out specially for working hard lumber, by the Preble Machine Works Co., of Chicago, and called the Jay-Eye-See, is making its way into railroad car shops, and is well spoken of wherever used.

JAMES G. WILSON, manufacturer of Wilson's Patent Rolling blinds, has removed his office and factory from 527 and 529 West Twenty-second street to 550 and 552 West Twenty-fifth street, New York.

HON. HYLAS SABINE, ex-State Commissioner of Railroads and Telegraphs, has been chosen general agent of the Dowling Automatic Car Coupler Co., with headquarters at Columbus, Ohio.

Our Directory.

We note the following changes since our last issue. Our readers will do us a great favor by giving us prompt notice of any changes that may come to their knowledge or of any errors that may be noticed in our list :

Alabama & Great Southern.—Chas. P. Ball, late Railroad Commissioner of Alabama, has been appointed Superintendent.

Cairo, Vincennes & Chicago.—E. F. Wells has been appointed Purchasing Agent.

Central Iowa.—E. E. Carver has been appointed Master Car-Builder.

Chicago & Atlantic.—Jacob Johann has been appointed Master Mechanic, vice C. J. Domville, resigned. Mr. Johann was for many years General Master Mechanic of the Wabash, St. Louis & Pacific.

Delaware, Lackawanna & Western.—W. D. Hager has been appointed Purchasing Agent, vice G. W. B. Cushing.

Naugatuck.—Henry A. Bishop has been appointed Assistant Superintendent.

Newburg, Dutchess & Connecticut.—Gilman D. Holmes has been appointed Master Mechanic and Master Car-Builder, vice W. G. Van Buskirk resigned.

New York, Lake Erie & Western.—F. M. Wilder will shortly retire from the position of Superintendent of Motive Power to be Superintendent of the Corliss Steam Engine Co., of Providence, R. I.

Seaboard & Roanoke.—C. W. Walker is appointed Master Machinist. D. W. Ballentine is appointed Master Car-Builder. These appointments are made in place of Mr. M. Pendleton, deceased.

Wabash, Chester & Western.—F. L. Hinkley has been appointed Superintendent, vice Robert Meek resigned.

The Century for 1885-86.—The remarkable interest in the War Papers and in the many timely articles and strong serial features published recently in THE CENTURY has given that magazine a regular circulation of more than 200,000 copies monthly. Among the features for the coming volume, which begins with the November number, are the War Papers by General Grant and others. These will be continued (most of them illustrated) until the chief events of the Civil War have been described by leading participants on both sides. General Grant's papers include descriptions of the battles of Chattanooga and the Wilderness. General McClellan will write of Antietam, General D. C. Buell of Shiloh, Generals Pope, Longstreet and others of the Second Bull Run, etc., etc. Naval combats, including the fight between the *Kearsarge* and the *Alabama*, by officers of both ships, will be described.

The "Recollections of a Private" and special War Papers of an anecdotal or humorous character will be features of the year.

Serial stories by W. D. Howells, Mary Hallock Foote and George W. Cable. Mr. Howell's serial will be in lighter vein than "The Rise of Silas Lapham." Mrs. Foote's is a story of mining life, and Mr. Cable's a novelette of the Acadians of Louisiana. Mr. Cable will also contribute a series of papers on slave songs and dances, including negro serpent-worship, etc.

Special features include "A Tricycling Pilgrimage to Rome," illustrated by Pennell; Historical Papers by Edward Eggleston, and others; Papers on Persia, by S. G. W. Benjamin, late U. S. Minister, with numerous illustrations; Astronomical Articles, practical and popular, on "Sidereal Astronomy;" Papers on Christian Unity, by representatives of various religious denominations; Papers on Manual Education, by various experts, etc., etc., etc.

Short stories by Frank R. Stockton, Mrs. Helen Jackson (H. H.), Mrs. Mary Hallock Foote, Joel Chandler Harris, H. H. Boyesen, T. A. Janvier, Julian Hawthorne, Richard M. Johnston, and others; and poems by leading poets. The Departments—"Open Letters," "Bric-à-Brac," etc.—will be fully sustained.

The illustrations will be kept up to the standard which has made THE CENTURY engravings famous the world over.

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St. Nicholas aims both to satisfy and to develop the tastes of its constituency; and its record for the past twelve years, during which it has always stood, as it stands to-day, at the head of periodicals for boys and girls, is a sufficient warrant for its excellence during the coming season. The editors announce the following as among the leading features for 1885-86 :

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"George Washington," by Horace E. Scudder. A novel and attractive Historical Serial.

Short Stories for Girls by Louisa M. Alcott. The first—"The Candy Country"—in November.

New "Bits of Talk for Young Folks," by "H. H." This series forms a gracious and fitting memorial of a child loving and child-helping soul.

Papers on the Great English Schools, Rugby and others. Illustrations by Joseph Pennell.

A Sea-coast Serial Story, by J. T. Trowbridge, will be life-like, vigorous and useful.

"Jenny's Boarding-House," a serial by James Otis. Dealing with news-boy life and enterprise.

Frank R. Stockton will contribute several of his humorous and fanciful stories.

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The Boyhood of Shakespeare, by Rose Kingsley. With illustrations by Alfred Parsons.

Short Stories by scores of prominent writers, including Susan Coolidge, H. H. Boyesen, Nora Perry, T. A. Janvier, Washington Gladden, Rossiter Johnson, Joaquin Miller, Sophie May, Hezekiah Butterworth, W. O. Stoddard, Harriet Prescott Spofford, and many others.

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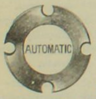

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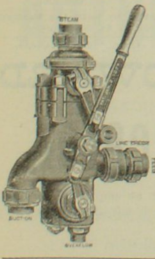

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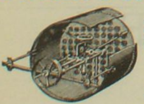

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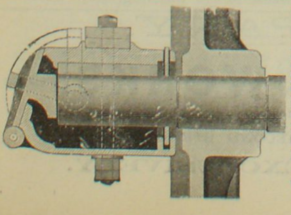

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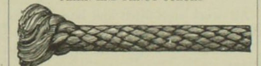

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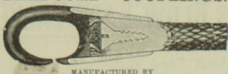

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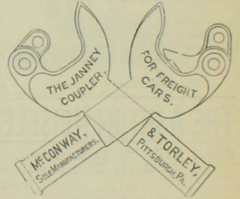
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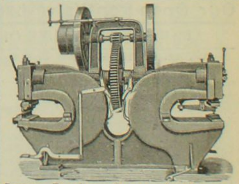

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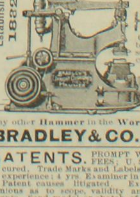

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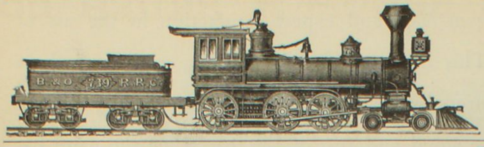

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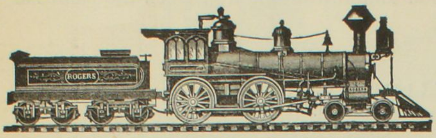

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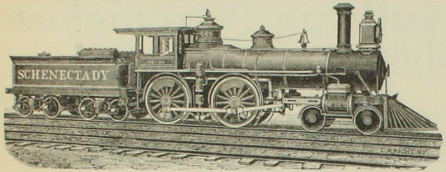

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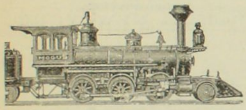

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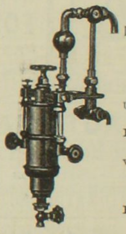

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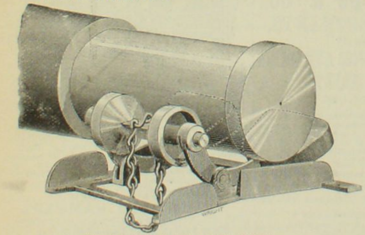

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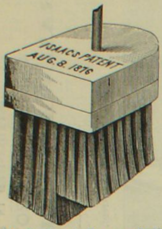

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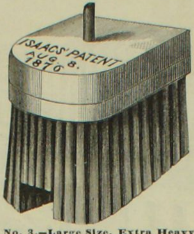

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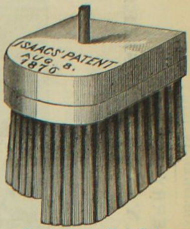

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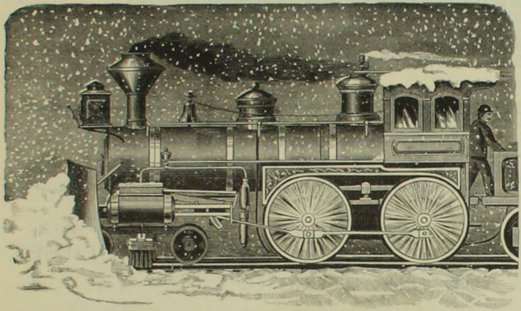

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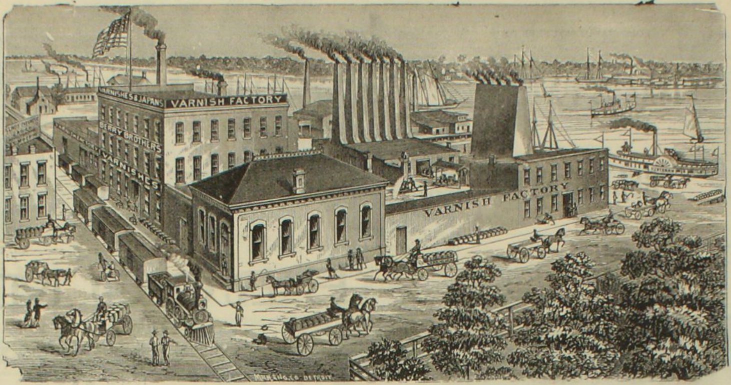
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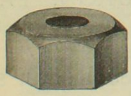

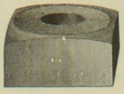

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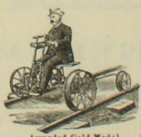

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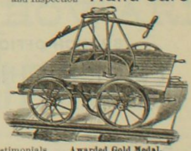

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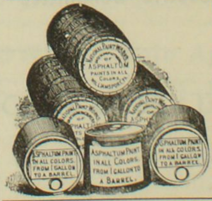
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ASPHALTUM PAINT IN ALL COLORS FROM 1 GALLON TO A BARREL
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CAR-BUILDERS' DICTIONARY

(Revised Edition).

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THE NATIONAL CAR-BUILDER, Morse Building, New York

DIRECTORY

of the Railroads of the United States and Canada, showing the gauge, length of road, number of locomotives and number of cars; and giving the names and titles of their principal officers in charge of the operating, purchasing and rolling stock departments

A

Adirondack R. R. 4-8½ gauge 60 m. 3 lo. 62 cars.
C. E. Durkee, *Supt* ....Saratoga, N. Y.
Jacob Myers, *M. M* .... .Saratoga, N. Y.
Jas. J. Traver, *M. C. B* ....Saratoga, N. Y.
Addison & Northern Penn'a Ry. 3 g. 51 m. 5 lo. 50 c.
F. M. Baker, *Gen. Supt* .. ..Addison, N. Y.
Alabama Great So'n R. R. (*See Cin., N. O. & T. P.*)
Albany & Susquehanna R. R. (*See D. & H. Canal Co.*)
Albemarle & Raleigh R. R. 4-8½ g. 33 m. 3 lo. 35 c.
Jas. H. Petty, *Gen. Supt* ......Tarboro, N. C.
Albert Ry. 4-8½ g. 51 m. 3 lo. 35 cars.
G. A. Robinson, *Man. & Pur. Agt.* Hillsboro, N. B.
Jas. McKay, *M. M. & C. B* ......Hillsboro, N. B.
Alexandria & Fredericksburg Ry. (*See Penna. R. R.;*
Alexandria & Washington R. R. ((7) *Div.*
Allegheny Valley R. R. 4-9 g. 259 m. 70 lo. 2202 c.
David McCargo, *Gen. Supt. & Pur. Agt.*; and
C. B. Price, *Supt.* (Riv. Div.).....Pittsburg, Pa.
A. A. Jackson, *Supt.* (L. G. Div.). Reynoldsville, Pa.
W. A. Wood, *M. M* ....Verona, Pa.
R. Gunning, *M. C. B* .... Verona, Pa.
Alliance, Niles & Ashtabula R. R. (*See Penna. Co.*)
Annapolis & Elk Ridge R. R. 4-8½ g. 20 m. 4 lo. 29 c.
W. H. Bians, *Supt. & Pur. Agt* ..Annapolis, Md.
John L. Beall, *M. Mach* .... Annapolis, Md.
Anniston & Atlantic R. R. 3 g. 9 m.
Tho. K. Scott, *Supt.* .... Anniston, Ala.
Antwerp & Paulding R. R. 4-8½ g. 6 m. 4 lo. 63 c.
E. C. Munson, *Gen. Man* ....Antwerp, O.
William Fitzsimmons, Jr., *Pur. Agt.* Antwerp, O.
Arizona & New Mexico Ry. 3 g. 71 m. 3 l. 60 cars.
W. H. Jones, *Gen. Supt. & P. A.* Lordsburg, N. M.
W. C. Boylan, *M. M. & M. C. B.* Lordsburg, N. M.
Arkansas Midland R. R. 3-6 g. 63 m. 4 lo. 45 cars.
A. H. Johnson, *Pr. & Gen. Man* ...Helena, Ark.
J. B. Johnson, *M. M. & M. C. B* ...Helena, Ark.
Arkansas & Louisiana Ry. 4-8½ g. 28 m.
J. D. Beardsley, *Supt* ....Washington, Ark.
Asheville & Spartanburg R. R. 5 g. 49 m. 2 lo. 12 c
Jas. Anderson, *Supt. & Pur. Agt.* .Spart'b'g, S. C.
M. M ....Spartanburg, S. C
Ashland Coal & Iron Ry. 4-8½ g. 22 m. 7 lo. 432 c.
Douglas Putnam, Jr., *Gen. Supt* Ashland, Ky.
Robt. Peebles, *Pur. Agt* ....Ashland, Ky.
E. M. Roberts, *M. M* ....Ashland, Ky.
Ashtabula & Pittsburgh Ry. (*See Penna. Co.*)
Atchison, Topeka & Santa Fé R. R.
4-8½ g. 2,620 m. 348 lo. 9,629 cars.
A. A. Robinson, *Gen. Man* .... Topeka, Kan.
Geo. Hackney, *Supt. Mach* ....Topeka, Kan.
Clem. Hackney, *Asst. Sup. Mach. Dept.* do.
A. C. Armstrong, *Pur. Agt* ... . Topeka, Kan.
Eastern Div.: D. J. Chase, *Supt.* ...Topeka, Kan.
Henry Hull, *G. F. Car Dept* .....Topeka, Kan.
John Fagan, *M. M* ....Atchison, Kan.
J. M. Smith, *M. M* .... .Kansas City, Mo.
Alfred Taylor, *M. M* ....Emporia, Kan.
Mid. Div.: H. R. Nickerson, *Supt.* Nickerson, Kan.
W. Y. Johnson, *M. M* .... .Nickerson, Kan.
W. Div.: C. M. Rathburn, *Supt* .....La Junta, Col.
A. C. Stiles, *M. M* .... .La Junta, Col.
D. H. Dotterer, *M. M* ....Raton, N. M.
Las Vegas Div.: Chas. Dyer, *Supt.* Las Vegas, N. M.
F. B. Woodruff, *M. M* .....Las Vegas, N. M.
J. H. Holman, *M. M.* ....Wallace, N. M.
Rio Gr. Div.: P. F. Barr, *Supt.* San Marcial, N. M.
E. Hackett, *M. M* ....San Marcial, N. M.
H. P. Olcott, *M. M* .. .... .Deming, N. M.
Geo. A. Hancock, *M. M* ....El Paso, Tex.
Sonora Div.: 265 m.
L. H. Waugh, *M. M* ....Guaymas, Mex.
Kan. Cy., Law. & So. Kan.
4-8½ g. 399 m. 24 lo. 787 c.
J. L. Barnes, *Supt* ....Lawrence, Kan.
T. D. Volk, *M. M* ....Ottawa, Kan
Atlanta & West Point R. R. (*See Western of Ala.*)
Atlantic & Danville Ry. 3 g. 17 m.
E. G. Sweatt, *Gen. Man* ....Waverly, Va
Atlantic & North Carolina R. R. (*See Midland; N. C.*)
Atlantic, Tenn. & Ohio R. R. (*See Rich. & Dan.; (2) Div.*)
Atlantic & Pacific R. R. 4-8½ g. 575 m.
D. B. Robinson, *Gen. Man.* Albuquerque, N. M.
F. P. Wherry, *Pur. Agt* ....St. Louis, Mo.
J. G. McCuen *S. M. P. & M.* Albuquerque, N. M.
B. C. Bosworth, *M. M* ....Coolidge, N. M.
Cal. Div.: C. L. Mixer, *Supt* ....Needles, Ar.
Augusta & Knoxville R. R. (*See Port Royal & Aug.*)
Austin & Northwestern R. R. 3 g. 60 m. 5 lo. 75 c.
J. A. Rhomberg, *Gen. Man* .. .... Austin, Tex.

B

Bachman Valley R. R. (*See Han. Junc., Han. & Gett.*)
Balt. & Delaware Bay R. R. 4-8½ g. 50 m. 2 lo 13 c.
Fred Gerker, *Gen. M. & P. A.* Chestertown, Md.
Baltimore & Hanover R. R. (*See H. J., H. & G.*)
Baltimore & Ohio R. R.
4-8½ g. 1,612 m. 574 lo. 17,339 cars.
B. Dunham, *Gen. Man* .... Baltimore, Md.
N. S. Hill, *Pur. Agt* ....Baltimore, Md.
Main Stem Div.: 4-8½ g. 972 m.
W. M. Clements, *Gen. Supt* ...Baltimore, Md.
A. J. Cromwell, *M. of M* .... ..Baltimore, Md.
E. W. Grieves, *M. C. B* ....Baltimore, Md.
Andrew Beckett, *M. M* .... .Baltimore, Md.
Wm. Edwards, *M. M* ...Martinsburg, W. Va.
Sam. Houston, *M. M* ....Piedmont, W. Va.
Robert Maxwell, *M. M* ......Cumberland Md.
W. P. Harris, *Supt. West of* Cumberland, Md.
S. B. Crawford, *M. M* .. ..Grafton, W. Va.
Alex. Laird, *M. M* ....Parkersburg W. Va.
W. B. McClung, *M. M* .....Wheeling, W. Va.
Pitts. Div.: H. P. Harris, *Supt* . . .Pittsburgh, Pa
I. N. Kalbaugh, *M. of M* ......Pittsburgh, Pa.
Trans-Ohio Divs.: G. J. Foreacre, *G. Supt.* Newark, O.
W. H. Harrison, *M. of Mach* ....Newark, O.
E. L. Weisgerber, *M. M* ....Newark, O.
H. M. Ingler, *M. M* .. ..Bellaire, O.
O. B. Perkins, *M. M* ....Zanesville, O.
Thos. Taylor, *M. M* ....Sandusky, O.
F. J. Gunther, *M. M* ....Chicago Junction, O.
Chi. Div.: F. H. Britton, *Supt. Trans.* Chicago, Ill.
Benj. Lowther, *M. M* ... . Garrett, Ind.
C. H. Campbell, *M. M* .... . So. Chicago, Ill
Newark & Straitsville Div.: N. Criswell, Shawnee, O.
Baltimore & Philadelphia. 4-8½ g. 40 m. 7 lo. 35 c.
B. Dunham, *Gen. Man* ....Baltimore, Md.
David Connell, *Supt* ....Wilmington, Del.
Baltimore & Potomac R. R. (*See Penna. R. R.; (7) Div.*)
Bangor & Piscataquis R. R. 4-8½ g. 63 m. 4 lo. 87 cars.
Arthur Brown, *Supt. & Pur. Agt* ..Bangor, Me.
C. S. Nason, *M. M* ... .Bangor, Me.
J. W. Comins, *M. C. B* ... . Oldtown, Me.
Bangor & Portland Ry. 4-8½ g. 25 m. 3 lo. 3 c.
C. Miller, *Pres. & Gen. Man* ...Blairstown, N. J.
Barclay R. R. 4-8½ g. 16 m. 6 l. 200 c.
F. F. Lyon, *Supt* ....Barclay, Pa.
J. A. Hardenburg, *Pur. Agt* ..21 Cort. st., N. Y.
Wm. Johnson, *M. M* .... Towanda, Pa.
Batesville & Brinkley R. R. 3 g. 40 m. 3 lo. 42 c.
R. W. Martin, *Pres* ....Little Rock, Ark.
W. J. Thompson, *Gen. Man* ..Little Rock, Ark.
Jas. Harrington, *Gen. Supt* ......Brinkley, Ark.
John White, *M. M* ....Brinkley, Ark.
Bath & Hammondsport R. R. 3 g. 10 m.
Allen Wood, *Gen. Man* . Hammondsport, N. Y.
Baton Rouge, Grosse Tête & Opelousas R. R.
5-6 g. 29 m. 3 lo. 12 c.
D. C. Montan, *Gen. Supt* .... ..Port Allen, La.
Bedford & Bloomfield Ry. 3 g. 43 m. 5 lo. 86 cars.
Jas. W. Kennedy, *Gen. Supt. & Pur. Agt.*; and
Capt. John Thumser, *M. M* ....Bedford, Ind.
Jas. Richards, *M. C. B* ....Bedford, Ind.
Bellaire, Zanesville & Cin. Ry. Co. 3 g. 112 m. 5 lo. 71 c.
S. L. Mooney, *Pres. & Gen. Man.* Woodsfield, O.
C. E. Hill, *M. M* ....Zanesville, O.
Bell's Gap R. R. 4-9 g. 25 m. 5 lo. 148 cars.
R. G. Ford, *Supt. & Pur. Agt* ...Bellwood, Pa.
Geo. Van Brunt, *M. M* ....Bellwood, Pa.
A. Zimmerman, *M. C. B* ....Bellwood, Pa.
Belt R. R. 4-8½ g. 12 m. 10 lo.
W. P. Ijams, *Supt* ....Indianapolis, Ind.
Belt Ry. 4-8½ g. 27 m.
Jas. D. Carson, *Gen. Man* ....Chicago, Ill.
R. W. Johnson, *M. M* .... Chicago, Ill.
Bennington & Glastonbury. 4-8 g. 10 m.
R. C. Root, *Pres* ... .Bennington, Vt.
Bennington & Rutland Ry. 4-8½ g. 59 m. 10 lo. 236 c.
E. D. Bennett, *Supt. & Pur. Agt.* Bennington, Vt.
Chas. McMasters, *M. M* ....Rutland, Vt.
Berlin Branch R. R. (*See Han. Junc., Han. & Gett.*)
Bladen, Columbus & Florida. 4-8½ g. 16 m. 2 lo. 2 c.
John Colville, *Pres* ... .Wilmington, N. C.
Bodie & Benton Ry. & Com. Co. 3 g. 34 miles.
Thomas Holt, *Supt. & Pur. Agt* ..... Bodie, Cal
E. H. Barton, *M. M. & C. B* ....Bodie, Cal.
Boston, Barre & Gardner. 4-8½ g. 37 m. 8 lo. 108 c.
Supt. & P. A ..Worcester, Mass.
Frank I. Goodwin, *M. M* .... Worcester, Mass.
Boston, Hoosac Tunnel & W'n Ry.
4-8½ g. 87 m. 18 lo. 1,038 cars.
H. L. Morrill, *Gen. Man* ..Mechanicsville, N. Y.
C. H. Cory, *Pur. Agt* ....Mechanicsville, N. Y.
C. H. Cory, *Supt. & M. M.* Mechanicsville, N. Y.
John S. Ellis, *M. C. B* .....Mechanicsville, N. Y.
Boston, Revere Beach & Lynn R. R. 3 g. 9 m. 7 lo. 55 c.
C. A. Hammond, *Supt. & P. Agt.* Boston, Mass.
R. D. Sutherland, *M. M* ....Boston, Mass.
John Coghlan, *M. C. B* ....Boston, Mass.
Boston, Winthrop & Point Shirley R. R.
3 g. 10 m. 1 lo. 8 c.
C. A. Parks, *Supt* ....Boston, Mass.
J. W. Davis, *M. M* ....Winthrop, Mass.
Boston & Albany R. R. 4-8½ g. 372 m. 245 lo. 6,111 c.
W. H. Barnes, *Gen. Man* .. ..Boston, Mass.
Edw. Gallup, *Gen. Supt* ......Springfield, Mass.
A. B. Underhill, *Supt. M. P* ...Springfield, Mass.
F. D. Adams, *Gen. M. C. B* ....Allston, Mass.
J. T. Chamberlain, *For. C. Shop* Allston, Mass.
H. B. Chesley, *Div. Supt* ....Boston, Mass.
G. H. Colby, *Div. M. M* ....Boston, Mass.
C. E. Grover, *Div. Supt* ....Springfield, Mass.
H. W. Eddy, *Div. M. M* ....Springfield, Mass.
J. B. Weston, *For. Car Sh.* Springfield, Mass.
W. H. Russell, Jr., *Div. Supt.* E. Albany, N. Y.
T. B. Purvis, *Div. M. M* ...East Albany, N. Y.
J. E. Doran, *For. Car Sh.* .East Albany, N. Y.
Boston & Lowell R. R.
4-8½ g. 555 m. 147 lo. 3,262 cars.
C. S. Mellen, *Gen. Supt* ....Boston, Mass
Geo. E. Shepard, *Pur. Agt* ....Boston, Mass.
Jas. K. Taylor, *Supt. R. S. & M.* Concord, N. H.
So. Div.: J. F. Crockett, *Supt* ... ..Boston, Mass.
H. S. Kolseth, *M. M* ... .Boston, Mass.
No. Div.: Geo. A. Todd, Supt ...Concord, N. H.
Geo. E. Shepard, *Pur. Agt* ...Concord, N. H.
C. C. Aspinwall, *M. M* ....Concord, N. H.
Wh. Mt. Div.: W. A. Stowell, *Supt.* Woodsville, N. H.
Geo. A. Ferguson, *M. M* .. .Lake Village, N. H.
Boston & Maine R. R. 4-8½ g. 491 m. 209 lo. 4,660 c.
J. T. Furber, *Gen. Man* ....Boston, Mass.
Geo. J. Fisher, *Pur. Agt* ....Boston, Mass.
Wm. Smith, *Supt. M. P.* ....Boston, Mass.
D. C. Richardson, *M. C. B* .....Lawrence, Mass.
West. Div.: Wm. Merritt, Jr., *Supt.* Boston, Mass.
East. Div.: D. W. Sanborn, *Supt* .Boston, Mass.
North Div.:
J. W. Sanborn, *Supt* ..Wolfboro Junc., N. H.
Boston & N. Y. Air Line R. R. (*See N. Y., N. H. & H.*)
Boston & Providence R. R. 4-8½ g. 67 m. 52 lo. 1,006 c.
A. A. Folsom, *Gen. Supt. & P. A.* Boston, Mass
Geo. Richards, *M. M* ....Roxbury, Mass.
Jno. Lightner, *M. C. B* ....Roxbury, Mass.
Bowling Green & Toledo R. R. 4-8½ g. 6 m. 2 lo. 4 c.
Wm. A. Wiggins, *Gen. Man.* Bowling Green, O.
Wm. A. Wiggins, *Pur. Agt* ..Bowling Green, O.
Bradford, Bordell & Kinzua R. R. 3 g. 42 m. 6 lo. 82 c.
Bradford, Eldred & Cuba. 3 g. 54 m. 6 l. 158 c.
Tonawanda Valley & Cuba. 3 g. 60 m. 5 lo. 31 c.
J. V. D. Loomis, *Supt* ....Attica, N. Y.
Jno. Delaney, *M. M. & C. B* ......Bradford, Pa.
Brattleboro' & Whitehall R. R. 3 g. 36 m. 3 lo. 56 c.
(*Operated by Central Vermont.*)
Bridgton & Saco River R. R. 2 g. 16 m. 2 lo. 19 c.
Wm. F. Perry, *Gen. Supt* ...... Bridgton, Me.
M. M. Caswell, *M. M. & Pur. Agt.* Bridgton, Me.
Brighthope Ry. 3 g. 37 m. 4 lo. 193 cars.
Jas. R. Worth, *Supt* ....Richmond, Va.
P. M. Buckingham, *Pur. Agt* Richmond, Va.
A. Gary, *Supt. Way & Works.* Winterpock, Va.
Robt. Kredell, *M. M* ....Chester, Va.
Brooklyn, Bath & Coney Island R. R.
4-8½ g. 7 m. 8 lo. 36 cars.
Geo. A. Gunther, *Gen. Man* ...Brooklyn, N. Y.
Aug. Wolff, *M. M* .... .Brooklyn, N. Y.
Brooklyn, Flatbush & Coney Island Ry.
4-8½ g. 8 m. 8 lo. 54 c.
J. L. Morrow, *Supt. & P. A* ...Brooklyn, N. Y.
Wm. Finley, *M. M* ....Brooklyn, N. Y.
Brooklyn & Rockaway Beach R. R.
4-8½ g. 3 m. 2 lo. 18 cars.
Wm. Warner, *Supt* .. ...East New York, N. Y.
Brunswick & Western R. R. 5 g. 172 m. 13 lo. 170 c
A. A. Gaddis, *Gen. Man. & P. A.* Brunswick, Ga.
J. K. Nightengale, *Pur. Agt* ...Brunswick, Ga.
W. R. Kline, *M. M* ....Brunswick, Ga.
Buff., N. Y. & Phil. R. R. 3 & 4-8½ g. 655 m. 120 l. 6,339 c.
Geo. S. Gatchell, *Gen. Supt* ..... Buffalo, N. Y.
W. W. Halsey, *Asst. to G. Supt* ..Buffalo, N. Y.
Allen Vail, *M. M* ....Buffalo, N. Y.
Buff. Div.: Henry Dwyer, *Supt* .... Buffalo, N. Y.
Roch. Div.: J. R. Watson, *Supt* .. . Olean, N. Y.
Pitts. Div.: E. H. Witter, *Supt* ......Oil City, Pa.
H. J. Bookhammer, *M. M* ....Oil City, Pa.
C. E. Turner, *M. M* .. ..Olean, N. Y.
Burlington, Cedar Rapids & Northern Ry
4-8½ g. 989 m. 101 lo. 4,206 cars.
C. J. Ives, *Pres. & Gen. Supt.* Cedar Rapids, Ia.
Robt. Williams, *V. P. & G. Supt.* Cedar Rapids Ia.
T. Stickney, *Pur. Agt* ....Cedar Rapids, Ia.
R. W. Bushnell, *M. M. & C. B.* Cedar Rapids, Ia.
Burlington & Lamoille R. R. 4-8½ g. 35 m. 4 lo. 64 c.
G. L. Linsley, *Gen. Man. & Supt.* Burlington, Vt.
F. G. Brownell, *M. M* .... Burlington, Vt.
Burlington & Mo. Riv. R. R. (in Neb.) (*See C. B. & Q.*)
Burlington & North-West'n Ry. 3 g. 38 m. 3 lo. 97 c.
Burlington & Western R. R. 3 g. 15 m. 38 c.
E. S. Edger, *Supt* .... .Burlington, Ia.
Burlington & Ohio River R. R. 4-8½ g.
R. Tanner, *Pur. Agt* ....Chicago, Ill.

C

Cairo, Vincennes & Chicago Line.
S. P. Wheeler, *Gen. Man* ....Cairo, Ill.
E. F. Wells, *Pur. Agt* ....Cairo, Ill.
A. Vantuyl, *M. M* ....Cairo, Ill.
California Northern R. R. 4-8½ g. 26 m. 2 lo. 17 c.
Andrew J. Binney, *Gen. Man* ..Marysville, Cal.
California Southern R. R. 4-8½ g. 127 m. 13 lo. 301 c.
J. N. Victor, *Supt* ....National City, Cal.
J. M. Keith, *M. M* ....National City, Cal.
Camden & Atlantic R. R. (*See Penna. R. R.; (2) Div.*)
Canada Southern Ry (*See Mich. Cen.; (2) Div.*)
Canada Atlantic Ry. 4-8½ g. 135 m.
D. C. Linsley, *Man* ....Ottawa, Ont.
M. Donaldson, *M. M* .... Ottawa, Ont.
Canadian Pacific Ry. 4-8½ g. 1,742 m. 118 l. 2,726 c.
W. C. Van Horne, *Gen. Man* ....Montreal, Can.
Francis R. F. Brown, *Mech. Supt.* Montreal, Can.
T. G. Shaughnessy, *Asst. G. M.*, Montreal, Can.
Alex. C. Henry, *Pur. Agt* ..... Montreal, Can.
Q. Div.: A. Davis, *Gen. Supt* ..... Montreal, Can.
W. Div.: J. M. Egan, *Gen. Supt* ..Winnipeg, Man.
Ontario Div.: W. White, *Gen. Supt.* Montreal, Can.
Cape F'r & Yadkin Val. R. R. 4-8½ g. 112 m. 7 lo. 60 c.
W. M. S. Dunn, *Gen. Supt* ...Fayetteville, N. C.
Isaac W. Clark, *M. M. & C. B.* .Fayetteville, N. C.
Cape Girardeau Southwestern Ry.
4-8½ g. 52 m. 3 lo. 51 cars.
Louis Houck, *Gen. Man* ..Cape Girardeau, Mo.
W. A. Penney, *Supt* ......Cape Girardeau, Mo.
D. L. Meyers, *Pur. Agt* ....Cape Girardeau, Mo.
Fred Glover, *M. M* .... Cape Girardeau, Mo.
Carolina Central R. R. (*See Ral. & Aug.*)
Carillon & Grenville Ry. 5-6 g. 13 m.
R. W. Shepard, *Pres* ....Montreal, Can.
Carson & Colorado R. R. (*See Va. & Truckee*).
Catasauqua & Fogelsville. 4-8½ g. 25 m. 6 lo. 581 c.
C. W. Chapman, *Supt. & P. A.* Catasauqua, Pa.
J. Thomas, *M. M* ... .Hokendauqua, Pa.
Chas. J. Holbach, *M. C. B* ....Catasauqua, Pa.
Catskill Mountain R. R. 3 g. 16 m. 2 lo. 26 cars.
Charles A. Beach, *Supt* ....Catskill, N. Y.
Cazenovia, Canastota & De Ruyter. (*See U., I. & E.*)
Central and South-Western Railroads (Ga.).
5 g. 1,115 m. 145 lo. 2,008 cars.
W. G. Raoul, *Pres* ....Savannah, Ga.
Wm. Rogers, *Gen. Supt* ....Savannah, Ga.
C. H. Carson, *Pur. Agt* ....Savannah, Ga.
Cen. Div.: D. D. Arden, *M. M* ......Savannah, Ga.
T. F. Warwick, *M. M* ... .Augusta, Ga.
F. Devine, *M. C. B* ....Savannah, Ga.
So.-West'n Div.: T. D. Kline, *Supt* .....Macon, Ga.
D. M. Gugel, *M. M* ....Macon, Ga.
S. A. Charpiot, *M. C. B* ....Macon, Ga.
Central R. R. of N. J. (*See Phil. & Read.; N. J. Cen. Div.*)
Central American & Pacific Ry. 3 g. 67 m. 1 lo. 11 c
W. C. Fitzsimmons, *Gen. Supt.* .Escuintla, Guat.
Central Branch Union Pac. (*See Mo. Pac.; (3) Div.*)
Central Iowa Ry. 4-8½ g. 412 m. 50 lo. 2,313 cars.
E. L. Dudley, *Supt* ....Marshalltown, Ia.
J. G. Johnston, *Asst. Supt* ....Marshalltown, Ia.
D. D. Phelps, *Asst. Supt* ....Monmouth, Ill.
C. H. Ackert, *Pur. Agt* ....Marshalltown, Ia.
John Player, *M. M* ... .Marshalltown, Ia.
E. E. Carver, *M. C. B.* ....Marshalltown, Ia.
Central Ontario Ry. 4-8½ g. 33 m. 4 lo. 66 cars.
J. B. McMullen, *Gen. Man* ....Picton, Ont.
James Falconar, *M. M* ....Trenton, Ont.
Central Pac. R. R. 4-8½ g. 4,303 m. 382 lo. 11,260 c.
A. N. Towne, *Gen. Man* ....San Francisco, Cal.
J. A. Fillmore, *Gen. Supt* ...San Francisco, Cal.
R. H. Pratt, *A. G. Supt* ....San Francisco, Cal.
J. R. Watson, *Gen. Pur. Agt* ..Sacramento, Cal.
A. J. Stevens, *Gen. M. M* .....Sacramento, Cal.
W. McKenzie, *Asst. G. M. M* ..Sacramento, Cal.
Benj. Welch, *Gen. M. C. B* ....Sacramento, Cal.
G. J. Turner, *Asst. G. M. C. B.* Sacramento, Cal.
Western: Visalia & Tulare Divs. and Northern Ry.
A. D. Wilder, *Supt* ....W. Oakland, Cal.
G. D. Welch, *M. M.* (W. Div.). W. Oakland, Cal.
W. B. Ludlow, *M. C. B.* (W. Div.) do.
S. Johnson, *M. M.* (T. Div.).......Tulare, Cal.
J. B. Wright, *Supt.* ....Sacramento, Cal.
M. W. Cooley, *M. M.* (*S. Div.*) .. Rocklin, Cal.
Truckee Div.: J. H. Whited, *Supt.* Wadsworth, Nev.
Geo. Gregg, *M. M* .... Wadsworth, Nev.
Wm. McPherson, *F. Car Sh.* .Wadsworth, Nev.
Humb't Div.: G. W. Coddington, *Supt.* Carlin, Nev.
W. F. Smith, *M. M* ....Carlin, Nev.
J. C. Doughty, *For. Car Sh* ... ...Carlin, Nev.
Salt Lake Div.: A. G. Fell, *Supt* .....Ogden, Utah.
James Lamb, *M. M* ... .Terrace, Utah.
A. Sherburne, *For. Car Sh* .. ...Ogden, Utah.
St. & Cop. R. R.: R. L. Myrick, *Supt.* .Stockton, Cal.
Los Angeles; and Yuma Divs. (So. Pac.):
E. E. Hewitt, *Asst. Supt* ....Los Angeles, Cal.
James Velsir, *M. M* .. ..Los Angeles, Cal.
T. T. Gilleland, *For. Car Sh.* Los Angeles, Cal.
Arizona Divs. (So. Pac.):
J. A. Muir, *Asst. Supt* ....Tucson, Ariz.
W. F. Smith, *M. M* .. ..Tucson, Ariz.
Rio Grande (S. Pac.) & El Paso (G. H. & S. A.) Divs.:
C. B. Seymour, *Supt* ....El Paso, Texas.
J. L. Bonner, *M. M* ... .El Paso, Texas.
H. C. Standish, *For. Sh* ....El Paso, Texas.
Central Texas & N'w'n R. R. (*See Hous. & Tex. Cen.*)
Central Vermont R. R. 4-8½ g. 864 m. 185 lo. 2,789 c.
J. W. Hobart, *Gen. Man* ....St. Albans, Vt.
J. M. Foss, *Gen. Supt* ....St. Albans, Vt.
W. J. Robertson, *Supt. M. P* ....St. Albans, Vt.
No. Div.: I. B. Futvoye, *Supt* .....St. Johns, P. Q.
Rut. Div.: J. Burdett, *Supt* ....Rutland, Vt.
N. L. Davis, *M. M. & C. B* .... Rutland, Vt.
Brattleboro & Whitehall R. R., and
Brat. Div.: E. F. Brooks, *Supt* ...Brattleboro, Vt.
New London No'n R. R. 143 m. 22 lo. 303 c.
C. F. Spaulding, *Supt. & P. A.* New London, Ct.
I. N. Dow, *M. M* ....New London, Ct.
S. O. Banks, *M. C. B* . .. .. .New London, Ct.
Chagrin Falls & Southern R. R. 3 g. 6 m. 1 lo. 12 c.
W. Hutchings, *Gen. Man* .....Chagrin Falls, O.
J. W. Williams, *Gen. Supt* ....Chagrin Falls, O.
Charleston & Savannah Ry. 5 g. 115 m. 15 lo. 200 c.
H. S. Haines, *Gen. Man* .... Savannah, Ga.
C. S. Gadsden, *Gen. Supt* ......Charleston, S. C.
H. A. Ulmo, *M. M* .... Savannah, Ga
Charlotte, Columbia & Augusta R. R. (*See Rich. & D.*)
Chateaugay R. R. 3 g. 34 m. 8 lo. 380 cars.
A. L. Inman, *Gen. Man* ..... Plattsburg, N. Y.
J. M. Davies, *Supt* ....Lyon Mountain, N. Y.
M. L. French, *Asst. Supt* .... Plattsburg, N. Y.
Chatham Ry. 4-8½ g. 9 m.
J. B. Snowball, *Man* .... Chatham, N. B.
Chattaroi Ry. 4-8½ g. 51 miles 11 loco. 483 cars.
J. H. Northrop, *Gen. Man. & P. A.* Ashland, Ky.
J. R. Martin, *M. M* ... . Ashland, Ky.
Joseph P. Burleigh, *M. C. B* ..... .Ashland, Ky.
Cheraw & Chester R. R. (*See Rich. & Dan.; (2) Div.*)
Cheraw & Darlington R. R. (*See Wil. & Wel.*)
Cheraw & Salisbury R. R. (*See Wil. & Wel.*)
Cherokee R. R. (*See East & West.*)
Cherry Valley R. R. 4-8½ g. 6 m. 3 lo. 6 cars.
E. T. Herndon, *Supt* ....Midland, Mo.
Chesapeake, Ohio & South-Western.
4-9 g. 398 m. 62 lo. 1,345 c.
Jas. L. Frazier, *Supt* ... .Louisville, Ky.
H. E. Huntington, *Pur. Agt* .....Louisville, Ky.
J. A. Dew, *Mast. Trans* .... Paducah, Ky.
R. H. Briggs, *Supt. M. P* ....Paducah, Ky.
D. L. Weaver, *M. M* .... ..Elizabethtown, Ky.
Jno. Fitzgerald, *M. M* .. ..Paducah, Ky.
Chesapeake & Ohio Ry. 4-9 g. 642 m. 181 l. 5,611 c.
Gen. Man ....Richmond, Va.
D. A. Sweet, *Asst. to Gen. Man.* Richmond, Va.
A. S. Emmons, *Pur. Agt* ....Richmond, Va.
T. L. Chapman, *Supt. M. P* .. ...Richmond, Va.
Eastern Div.: A. H. Wood, *Supt* ..Richmond, Va.
J. N. King, *M. C. B* .. ..Richmond, Va.
C. F. Thomas, *M. M* ....Richmond, Va.
Hunt. Div.: E. H. Barnes, *Supt* ..Hinton, W. Va.
W. T. Smith, *M. M* .....Huntington, W. Va.
H. C. Bassinger, *M. C. B.* Huntington, W. Va.
Lex. Div.: J. D. Yarrington, *Supt.* .Lexington, Ky.
W. T. Smith, *M. M* ......Huntington, W. Va.
Ky. Cent. Div. 4-9 g. 250 m. 27 l. 610 c.
H. E. Huntington, *Supt* .. ...Covington, Ky.
S. R. Tuggle, *M. M* ....Covington, Ky.
Cheshire R. R. 4-8½ g. 80 m. 31 lo. 531 cars.
R. Stewart, *Gen. Man* .... Keene, N. H.
H. H. Stone, *Pur. Agt* ....Keene, N. H.
F. A. Perry, *M. M* ....Keene, N. H.
A. E. Howard, *M. C. B* .. .. Keene, N. H.
Chester & Lenoir Ry. (*See Rich. & Dan.; (3) Div.*)
Chicago, Bur. & Kan. City Ry. (*See C. B. & Q.*)
Chicago, Burlington & Northern. 4-8½ g.
Geo. B. Harris, *Manager* .....St. Paul, Minn.
W. H. Holcomb, *Supt* ....La Crosse, Wis.
Geo. Hargreaves, *Pur. Agt* .... .. Chicago, Ill.
Chicago, Burlington & Quincy R. R.
4-8½ g. 3,608 m. 545 lo. 21,012 cars.
H. B. Stone, *Gen. Man* ... . Chicago, Ill.
(1) C., B. & Q., East of Mo. Riv.
J. D. Besler, *Gen. Supt* ... . Galesburg, Ill.
Wm. Irving, *Gen. Pur. Agt* ....Chicago, Ill.
G. W. Rhodes, *Supt. M. P.* .....Aurora, Ill.
Wm. Forsyth, *Mech. Eng* .... .Aurora, Ill.
Ill. Divs.: C. F. Resseguie, *Supt* ....Galesburg, Ill.
Chi. Div.: Geo. Alexander, *Supt* ... .Aurora, Ill.
L. E. Johnson, *M. M* ....Aurora, Ill.
Galesburg Div.: F. C. Rice, *Supt.* Galesburg, Ill.
Robert Colville, *M. M* .... Galesburg, Ill.
St. L. Div.: W. C. Brown, *Supt.* Beardstown, Ill.
A. Forsyth, *M. M* ....Beardstown, Ill.
Ia. & Mo. Divs.: W. F. Merrill, *Supt.* Burlington, Ia.
East. Div.: O. E. Stewart, *As. Supt.* Burlington, Ia.
Joel West, *M. M* ... .Burlington, Ia.
Mid. Div.: J. B. Maxon, *Asst. Supt.* Ottumwa, Ia.
West'n Div.: J. H. Duggin, *Asst. Supt* Creston, Ia.
C. W. Eckerson, *M. M* ....Creston, Ia.
Chi., B. & Kan. C'y and St. L., Keo. & No.-W'n Rys.
Robt. Law, *Gen. Supt* ....Keokuk, Ia.
W. H. Bartlett, *M. M* .... Burlington, Ia.
(2) C. B. & Q., West of Mo. Riv. 1,594 m.
G. W. Holdrege, *Gen. Man* .....Omaha, Neb.
Wm. Irving, *Gen. Pur. Agt* ...... Chicago, Ill.
D. Hawksworth, *M. M* ....Plattsmouth, Neb.
Bur. & Mo. Riv. & Neb. Ry. Divs.:
T. E. Calvert, *Gen. Supt* ......Lincoln, Neb.
D. E. Thompson, *Asst. Supt* ...Lincoln, Neb.
R. V. Div.: A. Campbell, *Asst. Supt.* McCook, Neb.
A. & N. Div.: J. McConniff, *Asst. Supt.* Lincoln, Neb.
Chicago, Fairchild & Eau Claire R. R.
4-8½ g. 22 m. 4 lo. 28 cars.
N. C. Foster, *Gen. Man* ....Fairchild, Wis.
C. I. Wickersham, *Pur. Agt* ....Chicago, Ill.
Chicago, Iowa & Dakota Ry. 4-8½ g. 26 m
John Porter, *Gen. Man* .. ..Eldora, Ia.
Chicago, Milwaukee & St. Paul R. R.
4-8½ g. 5,201 m. 626 lo. 19,018 cars.
Roswell Miller, *Gen. Man* ....Milwaukee, Wis.
Jos. F. Tucker, *Asst. Gen. M.* .Milwaukee, Wis.
J. T. Clark, *Gen. Supt* ....Milwaukee, Wis.
A. J. Earling, *Asst. Gen. Supt.* Milwaukee, Wis.
J. T. Crocker, *Pur. Agt* ....Milwaukee, Wis.
J. M. Lowry, *Gen. M. M* ....Milwaukee, Wis
E. Fairbairn, *M. M* ... . .Milwaukee, Wis
John Baillie, *Supt. Car Dept* ...Milwaukee, Wis
W. E. Kittridge, *M. C. B* .....Milwaukee, Wis
(1) C. & M. and C. & C. B. in Ill.:
G. O. Clinton *Supt* ....Chicago, Ill
Ch. & C. B. in Ia.:
R. B. Campbell, *Supt* ....Marion, Wis
La C. & Wis. Val. Divs.:
W. G. Collins, *Supt* ....Milwaukee, Wis
P. du C. & M. Pt. Divs.:
S. J. Collins, *Supt* ....Milwaukee, Wis.
(2) C. H. Prior, *Asst. Gen. Supt* ..Minneapolis, Minn.
H. & D. Div.: W. M. Kellie, *Supt.* do.
J. O. Pattie, *M. M* .... Minneapolis, Minn.
Ia. & Minn. Div.: E. H. Graves, *Supt.* do.
S. Minn. Div.: H. R. Williams, *Supt.* Lacrosse, Wis.
Riv. & Dub. Divs.: C. W. Case, *Supt.* Dubuque, Ia.
S. Charnley, *M. M* ....Dubuque, Ia.
Ia. & Da. Div.: F. D. Underwood, *Supt.* Ma'n C'y, Ia.
S. Cy. & Da. Div.: W. J. Underwood, *Supt.* Sioux Cy, Ia.
F. H. Moulton, *M. M* ....Yankton, Dak.
J. M. Horan, *For* ... .Yankton, Dak.
(3) D. A. Olin, *Asst. Gen. Supt* ....Racine, Wis.
R. & S. W. Divs.: D. L. Bush, *Supt* ...Racine, Wis
John Taylor, *M. M.* ....Racine, Wis
(4) Northern Div.: L. B. Rock, *Supt.* Milwaukee, Wis.
Wm. E. Kittredge, *M. C. B* ..Milwaukee, Wis
Chicago, Rock Island & Pac. Ry.
4-8½ g. 1,381 m. 309 lo. 8,367 cars.
R. R. Cable, *Pres. & Gen. Man* ....Chicago, Ill.
E. St. John, *Asst. Gen. Man* ....Chicago, Ill.
A. Kimball, *V. P. & Gen. Supt* .....Chicago, Ill
H. F. Royce, *Asst. G. Supt* .... ..Davenport, Ia.
F. A. Marsh, *Pur. Agt* ....Chicago, Ill.
T. B. Twombly, *Gen. M. M* ... .Chicago, Ill.
B. K. Verbryck, *Gen. M. C. B* ....Chicago, Ill.
Ill. Div.: R. H. Chamberlin, *Supt* .....Chicago, Ill.
R. Biester, *M. M* ....Chicago, Ill.
Sam'l Pullman, *M. C. B* ....Chicago, Ill.
Ia. Divs.: Jno. Given, *Supt* ....Des Moines, Ia.
J. G. Crockett, *M. M* ....Stuart, Ia.
Jas. E. Morrill, *M. M* ....Davenport, Ia.
Chas. M. Leonard, *M. C. B* ......Davenport, Ia.
K. & Des. M. Div.: Jno. Given, *Supt.* Des Moines, Ia.
S. W. Wakefield, *M. M* ....Keokuk, Ia.
Henry Kummer, *M. C. B* ....Keokuk, Ia.
So.-Wn. Div.: G. F. Walker, *Supt* ....Trenton, Mo.
R. O. Carscadin, *M. M* ....Trenton, Mo.
Chas. R. Best, *M. C. B* ....Trenton, Mo.
Chicago, Saginaw & Canada R. R. (*See Det., L. & N.*
Chicago, St. Louis & New Orleans R. R. (*See Ill. Cen.*
Chicago, St. Louis & Pittsburgh R. R.
4-9 g. 635 m. 202 lo. 3,510 cars.
James McCrea, *Gen. Man* ..... .Pittsburgh, Pa
John M. Miller, *Gen. Supt* ...... Columbus, O.
Wm. Mullins, *Gen. Pur. Agt* ...Pittsburgh, Pa
Edward B. Wall, *Supt. M. P* ....Columbus, O
1, 3 & 5 Divs.: J. J. Turner, *Supt* Richmond, Ind
Robert Curtis, *M. M* ....Columbus, O
J. L. Copeland, *G. F. Car Shops.* Columbus, O
Wm. Swanston, *M. M* ......Indianapolis, Ind.
W. C. Arp, *Gen. For* ....Indianapolis, Ind.
2 & 4 Divs.: Chas. Watts, *Supt.* Logansport, Ind
W. W. Reynolds, *M. M* .....Logansport, Ind.
Chas. H. Starr, *G. F. C. Shops*, Logansport, Ind
Chicago, St. Louis & Wn. R. R. 4-8½ g. 152 m. 11 lo. 1,799 c
F. E. Hinckley, *Gen. Man* ....Chicago, Ill.
B. T. Lewis, *Pur. Agt* ....Chicago, Ill.
A. H. Crocker *Supt* ....Streator, Ill
J. N. Chilson, *M. C. B* ....Streator, Ill
Chicago, St. Paul, Minneapolis & Omaha Ry.
4-8½ g. 1,301 m. 181 lo. 5,459 cars.
J. M. Whitman, *Gen. Supt* ......St. Paul, Minn.
W. H. S. Wright, *Pur. Agt* ......St. Paul, Minn.
Matt. Ellis, *M. M* ....St. Paul, Minn.
J. J. Ellis, *Asst. M. M* .. . .St. Paul, Minn
H. L. Preston, *M. C. B* ....Hudson, Wis
Ea. & No. Div.: A. A. Hobart, *Supt.* St. Paul, Minn
St. Paul and Sioux City Div.:
H. Spencer, *Supt* ....St. James, Minn.
H. C. Anderson, *Asst. M. M* ....Sioux Cy, Ia.
Neb. Div.: Jas. McCabe, *Supt* ......Omaha, Neb.
Chicago & Alton R. R. 4-8½ g. 849 m. 213 lo. 6,168 c.
C. H. Chappell, *Gen. Man* ....Chicago, Ill.
T. M. Bates, *Supt. of Trans* ...Bloomington, Ill.
A. V. Hartwell, *Pur. Agt* .. ....Chicago, Ill.
Wm. Wilson, *Supt. of Mach* ...Bloomington, Ill.
Jos. Townsend, *G. For. Car Dept.* do.
Chi. Div.: A. M. Richards, *Supt.* Bloomington, Ill.
St. L. & K. C. Div.: S. D. Reeves, *Supt.* Roodhouse, Ill.
Wm. Hill, *M. M* ....Slater, Mo.
Chicago & Atlantic Ry. 4-8½ g. 269 m.
F. Broughton, *Gen. Man* ....Chicago, Ill
J. H. Parsons, *Supt* ....Chicago, Ill.
Jacob Johann, *M. M.* ....Huntington, Ind
Chi. & East'n Ill. 4-8½ g. 252 m. 56 lo. 3,870 cars.
O. S. Lyford, *Gen. Supt* ....Chicago, Ill.
D. R. Patterson, *Pur. Agt* ... .Chicago, Ill.
P. W. Drew, *M. Trans* ....Chicago, Ill.
Allen Cooke, *M. M* ....Danville, Ill.
Chicago & Grand Trunk Ry. (*See Grand Trunk.*
Chicago & Great Southern Ry.
4-8½ g. 124 m. 4 lo. 122 c.
Geo. C. Kimball, *Rec* ....Attica, Ind.
H. Crawford, Jr., *Supt* ....Chicago, Ill
Chicago & Iowa R. R. 4-8½ g. 104 m. 18 lo. 237 cars.
T. J. Potter, *Gen. Man* ....Chicago, Ill.
H. D. Judson, *Act. Gen. Supt* .....Rochelle, Ill.
H. S. Bryan, *M. M* .... Aurora, Ill.
Chicago & Northwestern Ry.
4-8½ g. 3,843 m. 672 lo. 21,054 cars.
Marvin Hughitt, *2d V. Prs. & G. M.* Chicago, Ill
C. C. Wheeler, *Gen. Supt* ....Chicago, Ill
Jas. Wallace, Jr., *Ass't Gen. Supt.* Chicago, Ill.
R. W. Hamer, *Pur. Agt* .... .Chicago, Ill.
Geo. W. Tilton, *Supt. M. P. & M.*; and
W. A. Scott, *A. Supt. M. P. & M* ..Chicago, Ill
Wis. Div.: Ed. J. Cuyler, *Supt* ......Chicago, Ill.
Gal. Div.: Chas. Murray, *Supt* .... Chicago, Ill.
Pen'a Div.: W. F. Fitch, *Supt* .....Escanaba, Mich.
J. Symons, *M. M* .... Escanaba, Mich.
Mad. Div.: C. A. Swineford, *Supt.* .Baraboo, Wis.
H. D. Page, *M. M* ....Baraboo, Wis.
Minn. & Dak. Divs.: S. Sanborn, *Asst. Gen. Supt.*
Wis., St. P. & Dak. Div.:
Wm. Smith, *M. M* ....Winona, Minn.
Dak. Cen. Ry.: J. S. Oliver, *Supt* ....Huron, Dak
Ia. Div.: H. G. Burt, *Supt* ....Boone, Ia.
Robt. Quayle, *Act. M. M* .... Clinton, Ia.
No. Ia. Div.: M. Hopkins, *Supt* ...Eagle Grove, Ia.
Win. & St. P. Div.:
W. P. Cosgrave, *Supt* ... .Winona, Minn.
Wm. Smith, *M. M* ....Winona, Minn
Chicago & West Michigan:
4-8½ g. 409 m. 47 lo. 1,629 cars.
J. B. Mulliken, *V. P. & G. Man.* Muskegon, Mich.
J. K. V. Agnew, *Gen. Supt.* Grand Rapids, Mich.
Allen Bourne, *Pur. Agt* ....Detroit, Mich.
G. C. Watrous, *S. M. P. & R. S.* Muskegon, Mich.
Chicago & West'n Ind. R. R. 4-8½ g. 50 m. 12 lo. 150 c.
James D. Carson, *Gen. Man* ....Chicago, Ill.
R. W. Johnson, *M. M* ... .Chicago, Ill.
Cincinnati, Columbus & Hocking Val. Ry.
4-9 g. 25 m. 2 lo. 77 cars.
D. P. Hyatt, *Gen. Man* .. ..Dayton, O.
Cin., Georgetown & Portsmouth. 3 g. 35 m. 3 lo. 45 c.
M. Simmons, *Supt* ....Cincinnati, O
F. Enler, *M. M* ....Cincinnati, O.
Cincinnati & Green River Ry. 5 g. 17 m. 2 lo. 50 c.
G. B. Harper, *Supt* .... Yosemite, Ky.
F. S. Biggs, *M. M* ....Yosemite, Ky
Cin., Hamilton & Dayton R. R. 4-9 g. 352 m. 92 l. 2,932 c.
W. F. Stark, *Asst. Supt* ... .Cincinnati, O.

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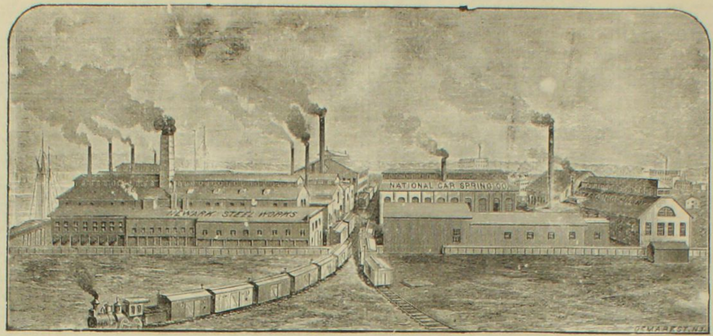

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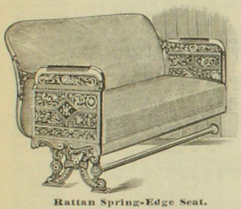

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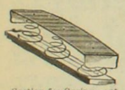
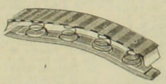


Section for Spring Seat.



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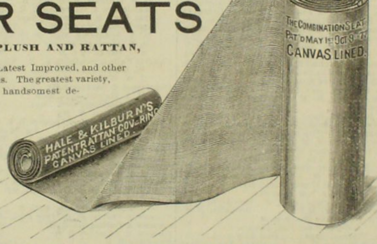

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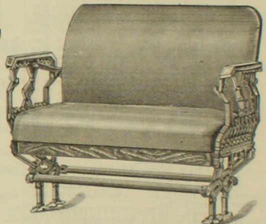

Plush "Sectional" Spring Seat.

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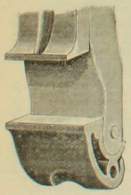
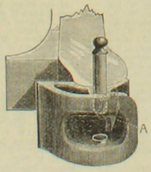
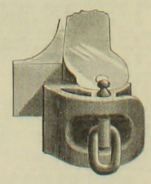
THE COWELL FREIGHT COUPLER.

AUTOMATIC HOOK COUPLER AND AUTOMATIC LINK COUPLER COMBINED IN ONE DEVICE.

The Safest and Best Link Coupler among all the Vertical Planes. Couples in All Positions as a Hook, unless set not to couple.







It has been simplified and perfected, a Buffer added, locks wholly by Gravity; and now fits present timbers of cars without change. Costs much less than any other Hook. Can be set with or without slack. Couples with the Miller.

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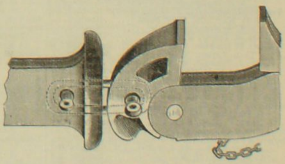

THE COWELL PLATFORM & COUPLING CO., CLEVELAND, O.

GEO E. SACKETT, Pres. J. T. WRIGHT, Supt

New Albany Steam Forge,

MANUFACTURERS OF

STANDARD CAR AXLES

AND

LOCOMOTIVE AXLES

Crank Pins, Equalizers, Slide-Bars, Connecting, Parallel and Piston Rods. Heavy Forgings of all Kinds of Iron and Steel.
Office and Works, New Albany, Ind

OCEANIC Steam Laundry COMPANY.

RAILROAD,
STEAMSHIP, HOTEL AND
RESTAURANT WORK.

630 GRAND AND 32 to 38 BISHOP STREETS,

CHAS. ZUST, Manager. JERSEY CITY, N. J. TELEPHONE CALL 214.

John Black, *Gen. M. M* .... Lima, O
W. H. H. Alison, *M. C. B* .... Cincinnati, O
Cincinnati, Hamilton & Indianapolis R. R.
4-8½ g. 98 m.
C. J. Hepburn, *Supt* .... Cincinnati, O
Day. & Mich. Div.:
Cincinnati, Indianapolis, St. Louis & Chicago Ry.
4-8½ g. 384 m. 71 lo. 3,279 cars.
J. W. Sherwood, *Supt* ...... Indianapolis, Ind.
Geo. Tozzer, *Pur. Agt* .... Cincinnati, O.
J. S. Patterson, *M. of Mach. & M. C. B.* Cincinn., O
Cincinnati, New Orleans & Texas Pacific Ry. Co.
5 g. 846 m. 123 lo. 3,464 cars.
John C. Gault, *Gen. Man* .... Cincinnati, O
Richard Carroll, *Gen. Supt* .... Cincinnati, O.
R. W. Healey, *Gen. Pur. Agt* ..... Cincinnati, O.
James Meehan, *S. M. P. & M* ... Cincinnati, O
Cin. So. Div.: W. W. Wells, *Supt* .. Somerset, Ky.
J. L. Tomlinson, *Asst. S. M. P.* .. Ludlow, Ky
John Richardson, *M. C. B* ..... Cincinnati, O.
A. Thomson, *M. M* ...... Chattanooga, Tenn.
Ala. Gr. S'n Div.: Chas. P. Ball, *Supt.*, and
George Manueil, *M. M* ... Chattanooga, Tenn
J. M. Kelly, *M. C. B* ..... Chattanooga, Tenn.
V. & M. Div.: E. F. Raworth, *Supt.* and
M. M .... Vicksburg, Miss.
V. S. & P. Div.: M. S. Belknap, *Supt.* Monroe, La.
W. Bell Smith, *M. M. & C. B* ... Monroe, La.
New Orleans & North-Eastern R. R.
Edmund L. Tyler, *Supt* ..... New Orleans, La.
I. W. Fowle, *M. M* .... Meridan, Miss.
Cincinnati, Lebanon & Northern Ry.
Geo. Hafer, *Pres* .... Cincinnati, O.
Cincinnati, Richmond & Chicago R. R. 4-9 g. 37 m.
C. J. Hepburn, *Supt* .... Cincinnati, O.
Cincinnati, Selma & Mobile R.R. 5 g. 71 m. 6 lo. 148 c.
A. McCollister, *Supt* .... Selma, Ala.
H. L. Wright, *Pur. Agt* .... Selma, Ala.
J. M. Levis, *M. M* .... Marion, Ala.
Cincinnati, Van Wert & Michigan R. R.
4-9 g. 94 m. 8 lo. 168 cars.
J. M. C. Marble, *Gen. Man* ...... Van Wert, O.
H. H. Garr, *Supt. M. & E* .... Van Wert, O.
Cin., Wabash & Mich. Ry. 4-8½ g. 165 m. 13 lo. 402 c.
Norman Beckley, *Gen. Man. & P. A.* Elkhart, Ind.
O. W. Lamport, *Supt* .... Wabash, Ind
S. B Tinker, *M. M. & M. C. B* ... Wabash, Ind
Cin., Wasn. & Balt. 4-8½ g. 312 m. 65 lo. 1,889 cars
Jas. H. Stewart, *Gen. Man* .... Cincinnati, O.
Edw. Evans, *M. M* .... Chillicothe, O.
T. G. Duncan, *Supt. Car Dept* .... Zaleski, O.
Cincinnati, Wheeling & New York R.R. 4-8½ g. 13 m.
T. M. Atkinson, *Gen. Man* .... Batesville, O.
Cincinnati & Eastern Ry. 3 g. 68 m. 6 lo. 133 cars.
4-8½ g. 50 m. 3 lo.
S. Woodward, *Rec* .... Cincinnati, O.
G. H. Wilber, *Gen. Sup. & Pur. Agt.* Cincinnati, O.
J C Homer, *M. M* .... Newtown, O.
P. W. Naughton, *M. M* .... Batavia, O.
Cincinnati & South-Eastern Ry. 4-8½ g. 18 m.
John V. Patton, *Gen. Man* ..... Newport, Ky.
Clarksburg, Weston & Glenville R. R.
3 g. 26 m. 3 lo. 45 cars.
A. H. Kunst, *Pres. & Gen. Man.* Weston, W. Va.
Sam. A. Steel, *M. M* .... Weston, W. Va.
F. Dillie, *M. C. B* .... Nottingham, O.
Cleveland, Columbus, Cincinnati & Indianapolis & St Louis Rys. and Dayton & Union R. R.
4-8½ g. 785 m. 246 lo. 7,988 cars.
G. M. Beach, *Gen. Man* .... Cleveland, O.
J. L. Yale, *Pur. Agt* .... Cleveland, O.
W. F. Turreff, *Gen. M. M* .... Cleveland, O.
Col. & Cin. Div.: Robt. Blee, *Supt* Cleveland, O.
E. Hudson, *M. M.* .... Cleveland, O
A. G. Steinbrenner, *G. For. Car Dept.* do.
Ind'p'lis Div.: John O. Ewan, *Supt.* Ind'polis, Ind
Wm. Garstang, *M. M.* ... Brightwood, Ind.
N. Mark, *G. For. Car Dept.* Brightwood, Ind.
Ind. & St L Ry.: Tho. Burrows, *Supt.* St. Louis, Mo.
Wm. Garstang, *M. M. & C. B.* Brightwood, Ind.
Day. & Un. Rd: J. H. Barrett, *Supt* ... Dayton, O.
H. S. Gordon, *For. M. Shops* ...... Dayton, O.
Clevel'd, Delphos & St. Louis R.R. 3 g. 56 m. 3 lo. 39 c.
I. H. Burgoon, *Gen. Man* .... Delphos, O.
B. F. Marshall, *M. M* .... Delphos, O.
Cleveland, Indiana & St. Louis R. R.
4-8½ g. 19 m. 2 lo. 20 cars.
J. A. Larned, *Rec. & Supt* ... Anderson, Ind
Cleveland, Mt. Vernon & Delaware R. R.
4-9 g. 144 m. 24 lo. 886 c.
N. Monsarrat, *Gen. Supt* .... Akron, O.
G. M. Taylor, *M. M. & C. B.* ... Mt. Vernon, O
Cleve., Youngstown & Pitts. R. R. 3 g. 30 m. 3 lo. 138 c.
D. T. Lumley, *Gen. Supt* .... Alliance, O.
C. H. Dorman, *M. M. & M. C. B* .... Alliance, O.
Cleveland, Lorain & Wheeling Ry.
4-8½ g. 158 m. 31 lo. 1,878 cars.
Oscar Townsend, *Gen. Man* ...... Cleveland, O.
Wm. Thornburg, *Supt* .... Lorain, O.
C. H. Waburton, *M. M* .... Lorain, O.
A. Warburton, *Gen. For* .... Lorain, O.
Cleveland & Canton R. R.
3 g. 160 m. 26 lo. 1,036 cars.
Samuel Briggs, *Gen. Man* ...... Cleveland, O
John Bean, *M. M* .... Canton, O
Cleve. & Marietta R. R. (*See Wheel. & Lake Erie.*)
Cleveland & Pittsburgh. (*See Penna. Co.; (4) Div.*)
Clifton & Port Hudson R. R. 4-8½ g. 22 m. 3 lo. 12 c.
John Bradley, *Supt* .... New Orleans, La.
W. F. Lockwood, *M. M* .... Clinton La.
E. D. Anderson, *M. M* .... Vicksburg, Miss
Clove Branch R. R. 4-8½ g. 8 m. 1 lo. 61 cars.
C. L. Kimball, *Supt* ...... Matteawan, N. Y.
W. G. Vanbuskirk, *M. M* ... Dutchess Jc., N. Y.
Coburg, Peterborough & Marmora Ry.
5-6 g. 47 m. 5 lo. 255 cars.
Jas. R. Barber, *Gen. Supt* ..... Cobourg, Ont.
Jas. Clark, *M. M* .... Cobourg, Ont
John Tinney, *M. C. B* .... Cobourg, Ont.
Colorado Central R. R. (*See Un. Pac.; (4) Div.*)
Columbia & Greenville R. R. (*See Rich. & D.; (3) Div.*)
Columbia & Puget Sound R.R. 3 g. 21 m. 7 lo. 114 c
J. L. Howard, *Gen. Supt* .. San Francisco, Cal.
Columbus, Hocking Valley & Toledo Ry.
4-9 g. 324 m. 90 lo. 7 353 cars.
G. R. Carr, *Gen. Supt* .... Columbus, O
W M Greene, *Pur. Agt* .... Columbus, O.
Ira G. Hutchins, *M. M* .... Columbus, O.
J. M. Rockafield, *M. C. B* .... Columbus, O
Tol. Div.: M. T. Seymour, *Supt* ..... Columbus, O.
Hock. V. Div.: M. P. L. Booth, *Supt.* Columbus, O.
Ohio Riv. Div.: C. D. Norris, *Supt* ...... Logan, O.
Columbus & Eastern R. R. in progress
J. E. Redfield, *Pres* .... Columbus, Ohio.
Columbus & Maysville Ry. (*See Cin. & East.*)
Columbus & Rome R. R. 3 g. 33 m. 3 lo. 30 cars.
M. E. Gray, *Supt* .... Columbus, Ga.
Columbus & Western Ry. 5 g. 89 m. 6 lo. 53 cars
E. A. Flewellen, *Gen. Man* ... Columbus, Ga.
R. A. Bridges, *M. M* .... Opelika, Ala.
Concord R. R. 4-8½ g. 141 m. 41 lo. 1,264 cars
H. E. Chamberlin, *Supt & P Agt.* Concord, N. H
J. T. Gordon, *M. M. & C. B.* ... Concord, N H
Concord & Claremont R. R. (*See Northern of N. H.*)
Conn. Riv. and Ver. Val. R. Rs. 4-8½ g. 130 m. 42 lo. 554 c.
J. Mulligan, *Supt. & Pur. Agt.* Springfield, Mass.
W. H. Stearns, *M. M. & M. C. B.* Springfield, Mass.
Conn. & Passumpsic Rivers R. R. (*See Passumpsic*)
Cooperstown & Susquehanna Valley R. R.
4-8½ g. 16 m. 2 lo. 14 cars.
Andrew Shaw, *Pres* .... Cooperstown, N. Y.
A. Mumford, *M. M* .... Cooperstown, N. Y.
Corning, Cowanesque & Antrim Ry.
(*See F. Br. Coal Co.*)
Cornwall R. R.. 4-8½ g. 12 m. 5 lo. 166 cars
J. M. Havard, *G. Supt. & M. M* .... Lebanon, Pa.
Levi Blouch, *M. C. B* .... Lebanon, Pa.
Cornwall & Lebanon R. R. 4-9 g. 5 m.
J. C. Jennings, *Supt* .... Lebanon, Pa.
Coudersport & Port Allegheny R. R.
3 g. 17 m. 2 lo. 64 cars.
B. A. McClure, *Gen. Supt* ..... Coudersport, Pa
Credit Valley Ry. 4-8½ g. 184 m. 22 lo. 535 cars.
Wm. Whyte, *Gen. Supt* .... Toronto, Ont.
John Macnab, *Pur. Agt* .... Toronto, Can.
D. Preston, *Mech. Supt* .... Toronto, Can.
Crescent Springs Ry. 3 g. 12 m. 2 lo. 50 c.
David Joyce, *Gen. Man* .... Lyons, Wis
W. R. Bourm, *Asst. Gen. Man.* Shell Lake, Wis.
John Devereaux, *Gen. Supt* .. Shell Lake, Wis
C. I. Wickersham, *Pur. Agt* .... Chicago, Ill
Ira Wood, *Supt. M. P. & M* ... Shell Lake, Wis
John Blackburn, *M. C. B* ..... Shell Lake, Wis
Crooked Creek R. R. 3 g. 9 m. 1 lo. 37 cars
Walter C. Willson, *Gen. Man.* Webster City, Ia
Geo. W. Post, *Pur. Agt* .... Lehigh, Ia.
Crown Point Iron Co.'s R. R. 3 g. 13 m. 3 lo. 135 c.
A. L. Inman, *Gen. Man* ...... Plattsburg, N. Y.
H. L. Reed, *Pur. Agt* .... Crown Point, N. Y.
Jas. McMann, *Supt* .... Crown Point, N. Y.
C. W. Sanders, *M. M* ...... Crown Point, N. Y.
Cumberland Valley R. R. 4-9 g. 127 m. 25 lo. 474 cars.
J. F. Boyd, *Supt* .... Chambersburg, Pa.
A. S. Hull, *M. M* .... Chambersburg, Pa.
C. Wicke, *M. C. B* .... Chambersburg, Pa.
Cumberland & Maurice River R. R. 4-8½ g. 20 m.
L. H. Dowdney, *Supt* .... Port Norris, N. J.
Cumberland & Penn. R. R. 4-8½ g. 55 m. 28 lo. 625 c.
P. L. Burwell, *Gen Supt & P A.* Cumberland, Md.
N. W. Howson, *Mast. of Mach.* Mt. Savage, Md.
Nathan Binix, *M. C. B* ...... Mt. Savage, Md.

D

Danville & New River R. R. 3 g. 43 m. 2 lo. 30 c.
W. T. Sutherlin, *Gen. Man* .... Danville, Va.
W. T. Whittaker, *M. M* .... Danville, Va.
Danbury & Norwalk R. R. 4-8½ g. 36 m. 7 lo. 112 c.
C. M. Crawford, *G. Supt. & P. A.* S. Norwalk, Ct.
W. H. Wilkinson, *M. M. & C. B.* Danbury, Conn.
Danville, Mocksville & So.-Wn. R. R. 3 g. 28 m.
H. M. Shivler, *Supt* .... Leakesville, N. C.
Danville, Olney & O. R. R.R. 4-8½ g. 78 m. 3 lo. 34 c.
C. E Henderson, *Rec. & Man* .... Olney, Ill.
W. A. Bell, *M. M & C. B* .... Kansas, Ill
Dayton & Toledo R. R. 3 g. 96 m.
C. E. Henderson, *Gen. Man* .... Dayton, O.
J. E. Gimperling, *Supt* .... Dayton, O.
Dayton & Union R. R. (*See Clev., Col., Cin. & Ind.*)
Dayton & Michigan R. R. (*See Cin., Ham. & Day.*)
Dayton & Ironton R. R.
C. E. Henderson, *Gen. Man.* Indianapolis, Ind.
H. C. Norton, *Pur. Agt* ... Indianapolis, Ind.
E. Heisrodt, *Supt. Mach* .... Dayton, O.
Del. Lackawanna & W. and N. Y., Lack. & W. R. Rs.
4-8½ g. 930 m. 436 lo. 31,989 cars.
Wm. F. Halstead, *Gen. Supt* ..... Scranton, Pa.
W. D. Hager, *Pur. Agt* .... New York, N. Y.
Walter Dawson, *Mast. of Mach* ... Scranton, Pa.
Robt. McKenna *M. C. B* .... Scranton, Pa.
Bloomsb'g Div.: C. Graham, *M. M.* Kingston, Pa.
Utica Div.: A. C. Salisbury, *Supt* .... Utica, N. Y.
Thos. Thatcher, *M. M* .... Utica, N. Y.
Morris & Essex Div.: Sussex; P. & D. and C. R. Rs.
A. Reasoner, *Supt* .... Hoboken, N. J.
W. H. Lewis, *M. M* .... Kingsland, N. J.
J. W. Baker, *Mast. Car Rep* .... Dover, N. J
Oswego & Syracuse Div.:
W. K. Niver, *Supt* .... Oswego, N. Y.
Jas. Buchanan, *M. M* .... Syracuse, N. Y.
Syracuse, Binghamton & New York R. R.
4-8½ g. 81 m. 20 lo. 598 cars.
W. K. Niver, *Gen. Supt* ...... Syracuse, N. Y.
Jas. Buchanan, *M. M* .... Syracuse, N. Y.
Cayuga Div.: *Supt* Ithaca, N. Y.
Buffalo Div.: T. B. Griffith, *M. M* .. Buffalo, N. Y.
Delaware, Maryland & Virginia R. R.
4-8½ g. 101 m. 7 lo. 145 cars.
Tho. Groom, *Supt* .... Lewes, Del.
Geo. Messick, *M. M* .... Lewes, Del.
W. H. Virden, *M. C. B* .... Lewes, Del.
Delaware River R. R. 4-8½ g. 20 m. 3 lo. 8 cars.
E. H. Green *Supt* .... Pedricktown, N. J.
Delaware & Hudson Canal Co.
4-3 and 4-8½ g. 634 m. 180 lo. 10,799 cars.
H. G. Young, *Gen. Man* ...... Honesdale, Pa.
J. White Sprong, *Pur. Agt* .... Albany, N. Y.
R. C. Blackall, *Supt. of Mach* ..... Albany N. Y
Susq. Div.: C. D. Hammond, *Supt.* Albany, N. Y.
Tho. Howard, *M. M* .... Oneonta, N. Y.
J. R. Skinner, *M. C. B* .... Oneonta, N. Y.
Sar. & Ch. Divs.: *Supt* ... Troy, N. Y.
J. L. Corey, *M. M* ...... Green Island, N. Y.
Chr. Körner, *M. C. B* .... Green Island, N. Y.
Pa. Div.: R. Manville, *Supt & Pur Agt.* and
S. H. Dotterer, *M. M* .... Carbondale, Pa.
T. Orchard, *M. C. B* .... Carbondale, Pa.
Denver Circle R. R. 3 g. 12 m. 7 lo. 15 cars
Theo. C. Henry, *Gen. Man* .... Denver, Col
W. B. Sprague, *Gen. Supt* .... Denver, Col.
Denver, Utah & Pacific R. R. 3 g. 34 m. 4 lo. 171 c
L. M. Fouts, *Supt* .... Denver, Col.
Denver & New Orleans. 4-8½ g. 140 m. 11 lo. 400 c.
C. W. Fisher, *Gen. Man* .... Denver, Col.
Chas. Wheeler, *Pur. Agt* .... Denver, Col.
J. H. Kirk, *M. M. & M. C. B* ..... Denver, Col.
Denver & Rio Grande Ry. 3 g. 1,317 m. 222 lo. 5,932 c.
W. S. Jackson, *Rec* .... Denver, Col.
C. M. Hobbs, *Pur. Agt* .... Denver, Col.
N. W. Sample, *Supt. M. P. & M* ... Denver, Col.
(1) Col & N. M. Div.: R. E. Ricker, *G. S.* Denver, Col
1st Div.: W. W. Borst, *Supt* .... S. Pueblo, Col.
2d Div.: Cole Lydon *Supt* ...... Alamosa, Col.
3d Div.: G. W. Cook, *Supt* .... Leadville, Col.
4th Div.: R. M. Ridgway, *Supt* .... Salida, Col.
Denver, Rio Grande & Western Ry. 3 g. 369 m.
W. H. Bancroft, *Rec. & Gen. Supt.*
Salt Lake City, Utah.
A. L. Horner, *Ass't Supt* Salt Lake City, Utah.
S. C. Smith, *M. M* ...... Salt Lake City, Utah.
Des Moines, Osceola & Southern R. R.
3 g. 100 m. 7 lo. 253 cars
Jas. Donahue, *Supt* .... Des Moines, Ia.
Wm Persing, *M. M* .... Osceola, Ia.
Elias Tonet, *M. C. B* .... Osceola, Ia.
Des Moines & Ft. Dodge. 4-8½ g. 144 m. 13 lo. 350 c.
C. N. Gilmore, *Supt* .... Des Moines, Ia.
John McGrayel, *M. M* ...... Grand Junction, Ia.
E. A. Avery, *M. C. B* .... Grand Junction, Ia.
Det., Bay City & Alpena R. R. 3-2 g. 48 m. 5 lo. 227 c.
Milo Eastman, *Supt* .... East Tawas, Mich.
Det., Lansing & No'n R. R. 4-8½ g. 222 m. 84 lo. 1027 c
John B. Mulliken, *Gen. Man* ...... Detroit, Mich.
Allan Bourn, *Pur. Agt* .... Detroit, Mich.
Thos. M. Fish, *Gen. Supt* .... Ionia, Mich.
G. C. Watrous, *S. M. P. & R. S* ... Ionia, Mich.
Det., Mack. & Marq. R.R. 4-8½ g. 152 m. 16 lo. 1,112 c.
Andrew Watson, *Gen. Supt* ... Marquette, Mich.
W. J. Tench, *Pur. Agt* .... Marquette, Mich.
John B. Wilson, *Mech. Supt* .... Marquette, Mich.
Dorchester & Delaware R.R. (*See Penna. (4) Del. Div.*)
Dubuque & Dakota R. R. 4-8½ g. 64 m. 2 lo. 54 cars.
A. C. Goodrich, *Supt* .... Hampton, Ia.
W. S. Couch, *Pur. Agt* .... Dubuque, Ia.
Duck River Valley R. R. (*See Nash., Chat. & St. L.*)
Dunkirk, Allegheny Valley & Pittsburgh R. R.
4-8½ g. 91 m. 14 lo. 102 cars.
D. Thayer, *Gen. Supt* .... Dunkirk, N. Y.
Chas. Reed, *Pur. Agt* .... New York, N. Y.
J. C. Haggett *M. M. & C. B* ..... Dunkirk, N. Y.

E

East Alabama Ry. 5 g. 22 m. 3 lo. 19 cars.
W. W. Barnes, *Supt* .... Opelika, Ala.
East Broad Top R. R. 3 g. 30 m. 7 lo. 260 cars.
A. W. Sims, *Supt* .... Orbisonia, Pa.
A. W. Greenwood, *M. M* .... Orbisonia, Pa.
East St Louis & Carondelet Ry. 4-9 g. 4 lo. 27 c.
Joseph Hill, *Gen. Supt* ..... East St. Louis, Ill.
East Tenn. & Western North Car. R R.
3 g. 34 m 3 lo. 73 cars.
Thomas E. Matson, *Supt* Elizabethton, Tenn
East Tennessee, Virginia & Georgia R. R.
5 g. 1,453 m. 166 lo. 3,670 cars.
Henry Fink, *Rec* .... Knoxville, Tenn
C. H. Hudson, *Gen. Man* .... Knoxville, Tenn
J. E. Wilcox, *Pur. Agt* .... Knoxville, Tenn
W. H. Thomas, *Supt M. P.* Knoxville, Tenn.
East Tenn. Div. and No. Car. and Ohio Branches.
F. K. Huger, *Supt* .... Knoxville, Tenn.
B. J. Sitton, *M. M* .... Knoxville, Tenn.
Jos. Armbruster, *M. C. B* .... Knoxville, Tenn.
Alabama Div.: J. M. Bridges, *Supt* ... Selma, Ala.
Simon Gay, *M. M* .... Selma, Ala.
W. W. Pierce, *M. C. B* .... Selma, Ala.
Memphis & Charleston R. R. (Div.):
R. B. Pegram, Jr., *Supt* ...... Memphis, Tenn
H. N. Burford, *M. M* .... Memphis, Tenn
Georgia Div.: J. W. Fry, *Supt* ...... Atlanta, Ga.
J. E. Mallory, *Ass't Supt* .... Macon, Ga.
W. A. Walden, *M. M* .... Atlanta, Ga.
J. H. Perkins, *M. C. B.* .... Atlanta, Ga.
East & West R. R. of Ala. 3 g. 110 m. 9 lo. 85 c.
T. J. Nicholl, *Manager* .... Cedartown, Ga.
C. F. West, *M. M. & C. B* ...... Cedartown, Ga
Eastern R. R. 4-8½ g. 283 m. 110 lo. 2,268 cars.
Payson Tucker, *Gen. Man* .... Boston, Mass.
D. W. Sanborn, *Mast. of Trans.* Boston, Mass.
G. F. Hurd, *Pur. Agt* .... Boston, Mass.
Amos Pilsbury, *S. M. P. & M.* .. E. Boston, Mass.
A. M. Waitt, *G. For. Car Dept* .... Salem, Mass.
Con'y Div.: J. W. Sanborn, *Supt.*, Wolfboro J., N. H.
Eastern Kentucky R. R. 4-8½ g. 34 m. 5 lo. 160 c.
H. W. Bates, *Man. & Pur. Agt* ... Riverton, Ky.
H. W. Crawford, *M. M* .... Hunnewell, Ky.
Eastern (Maine) R. R. (*See Maine Central.*)
Eastern Shore R. R. 4-8½ g. 38 m. 3 lo. 9 c.
W. Thompson, *Supt* .... Princess Anne, Md.
F. Strattner, *M. M* .... Princess Anne, Md.
Elmira, Cortland & Northern R. R. 4-8½ g
A. A. McLeod, *Gen. Man* .... Elmira, N. Y.
Edw. Mahler, *Pur. Agt* .... Elmira, N. Y.
Thos Kearsley, *M. M. & M. C. B.* Cortland, N. Y.
Erie & Huron Ry. 4-8½ g. 40 m.
E. O. Bickford, *Gen Man* .... Toronto, Ont.
Erie & Pittsburg R. R. (*See Penna. Co.; (3) Div.*)
Etowah & Deaton's R. R. 3 g. 9 m.
D. M. Rogers, *Gen. Man* .... Etowah, Ga.
Eureka Springs Ry. 4-8½ g. 19 m. 1 lo. 9 cars.
Powell Clayton, *Gen. Man.* Eureka Springs, Ark.
Eureka & Palisade R. R. 3 g. 97 m. 7 lo. 125 cars.
B. Gilman, *Gen. Supt & Pur. Agt.* Eureka, Nev.
J. M. Crawford, *M. M* .... Palisade, Nev.
A. S. Longley, *M. C. B* .... Palisade, Nev.
European & North American R. R. (*See Maine Cen.*)
Evansville, Rockport & E'n Ry. 4-9 g. 71 m. 5 lo. 98 c
H. L. Shepard, *Supt* .... Evansville, Ind
Evansv. & Terre Haute. 4-8½ g. 169 m. 26 lo. 973 c.
D. J. Mackey, *Gen. Supt* ...... Evansville, Ind.
John Torrance, *M. M* .... Evansville, Ind.

F

Fall Brook Coal Co. 4-8½ g. 250 m. 60 lo. 2,006 c.
Pine Creek Ry.; Corning, Cowanesque & Antrim; Cowanesque Br.; Syracuse, Geneva & Corning; Geneva & Lyons; and New York & Penn Yan.
A. H. Gorton, *Gen. Supt* .... Corning, N. Y.
G. R. Brown, *Asst. Supt* .... Corning, N. Y.
W. H. Chaphe, *Pur. Agt* .... Corning, N. Y.
Wm. A. Foster, *Supt. R. S & Mach* Corning, N. Y.
C. J Butter, *M. C. B* .... Corning, N. Y.
Fitchburg R. R., 4-8½ g. 152 m. 100 lo. 3,566 cars.
John Adams, *Gen. Supt* .... Boston, Mass.
F. S. Pratt, *Pur. Agt* .... Boston, Mass.
Orlando Stewart, *Supt. M. P* ...... Boston, Mass.
J. W. Marden, *Supt. C. Dept.* Charlestown, Mass.
Flint & Pere Marq. 4-8½ g. 346 m. 78 lo. 2,664 cars
H. C. Potter, *Gen. Man* ..... E. Saginaw, Mich.
D. Edwards, *Asst. Gen. Man.* E. Saginaw, Mich
G. G. Cook, *Pur. Agt* .... E. Saginaw, Mich.
Sanford Keeler, *Gen. Supt* .. E. Saginaw, Mich.
W. F. Potter, *Supt.* (E. Div.) .. E. Saginaw, Mich
W. F. Potter, *Supt.* (W. Div.) .. E. Saginaw, Mich.
T. J. Hatswell, *M. M* .... E. Saginaw, Mich.
H. M. Perry, *M. C. B* .... E. Saginaw, Mich.
Florida Ry. & Nav. Co. 5 g. 488 m. 31 lo. 397 c.
D. E. Maxwell, *Gen. Supt* .... Fernandina, Fla.
R. V. Dohoney, *M. M. & C. B* Fernandina, Fla.
Florida Southern Ry. 3 g. 159 m. 17 lo. 155 cars.
Sherman Conant, *Gen. Man* ...... Palatka, Fla.
Jas. D. Hollister *Supt. & P. Agt* .. Palatka, Fla
St. J. & L. Eustis Div.: 50 m.
W. J. Jarvis, *Supt* .... Ft. Mason, Fla.
W. B Denham, *Asst. Supt* ... Ft. Mason, Fla.
W. M. Rutherford, *M. M* .... Ft. Mason, Fla.
Fonda, Johnst'n & Gloversv. 4-8½ g. 26 m. 5 lo. 35 c.
Lawton Caten, *Supt* .... Gloversville, N. Y.
G. V. Putman, *M. M* .... Gloversville, N. Y.
Fond du Lac, Amboy & Peoria. 3 g. 30 m. 2 lo. 35 c.
Alonzo Kinyon, *Supt. & P. A.* Fond du Lac, Wis.
Fort Dodge & Fort Ridley R. R. (*See Minn. & St. L.*)
Franklin & Prov. & Hopkinton. 22 m.
E. T. Logee, *Supt* .... Milford, Mass.
Ft. Madison & No.-West'n Ry. 3 g. 45 m. 4 lo. 121 c.
S. B. Kenrick, *Rec. & Pur. Agt.* Ft. Madison, Ia
I. L. Lamb, *M. M. & C. B* ..... Ft. Madison, Ia
Ft. Wayne, Cin. & Louisv. 4-8½ g. 128 m. 10 lo. 250 c.
White Water R. R 4-8½ g. 65 m 5 lo. 170 cars.
W. W. Worthington, *Gen. Supt* .. Ft. Wayne, Ind.
T. H. Haberkorn, *M. M* .... Ft. Wayne, Ind.
Wm. Knight, *M. C. B* .... Ft. Wayne, Ind.
Ft. Worth & Denver City Ry. 4-8½ g. 114 m. 8 lo. 443 c.
C. L. Frost, *Gen. Supt* ...... Fort Worth, Tex.
Freehold & New York Ry. 4-8½ g. 15 m. 4 lo. 40 c.
J. E. Ralph, *Supt. & Pur. Agt* Freehold, N. J.
M. C. Mooney, *M. M* .... Freehold, N. J.
C. H. Snedeker, *M. C. B* ...... Freehold, N. J.
Fulton County N. G. Ry. 3 g. 61 m. 4 lo. 168 cars.
A. C. Atherton, *Gen. Supt. & P. Agt.* Lewiston, Ill.

G

Gainesville & Dahlonega R. R. 3 g. 15 m.
W. P. Price, *Pres* .... Dahlonega, Ga.
Gainesville, Jefferson & Southern R.R. (*See Cen. of Ga*)
Gal., Harrisburg & San Antonio Ry. (*See Cen. Pac.*)
Galveston, Houston & Hend. R.R. (*See Mo. Pac. (5) Div.*)
Galveston, Sabine & St. Louis Ry.
4-8½ g. 28 m. 2 lo. 33 cars
Brad. Barner, *Gen Man* ...... Longview, Tex.
Chas. H. Jewell, *Gen. Supt* ..... Longview, Tex.
Geneva, Ithaca & Sayre R. R. (*See Lehigh Val.*)
George's Creek & Cumberland R. R.
4-9 g. 25 m. 6 lo. 212 cars.
J. A. Millholland, *Gen. Man* .. Cumberland, Md.
Georgetown & Lane's R. R. 5 g. 36 m. 2 lo. 52 c.
G. W. Earle, *Gen. Supt* ...... Georgetown, S. C
Georgia R. R. 5 g. 307 m. 42 lo. 1,048 cars.
John W. Green, *Gen. Man* .... Augusta, Ga.
John S. Cook, *M. M.* .... Augusta, Ga.
T. M. Preval, *M. C. B* .... Augusta, Ga.
Georgia Pacific Ry. 5 g. 218 m.
E. B. Thomas, *Gen. Man* ..... Richmond, Va.
I. Y. Sage, *Gen. Supt* .... Birmingham, Ala.
S. H. Purcell, *Div. Supt* .... Greenville, Miss.
West Div.: J. P Meredith, *Supt.* Bir'ham, Ala.
Gettysburg & Harrisburg R. R. 4-9 g. 21 m.
W. H. Woodward, *Supt.* Pine Grove Furnace, Pa.
G'd Rap., Newaygo & L. S. R. R. (*See Chic. & W. M.*)
Grand Rapids & Indiana. 4-9 g. 528 m. 56 lo. 2,083 c.
W. O. Hughart, *Gen. Man.* Grand Rapids, Mich.
W. R Shelby, *Pur. Agt* ... Grand Rapids, Mich.
S. D. Bradley, *M. M* ...... Grand Rapids, Mich.
No'n Div.: J. M. Metheany, *Supt.* G'nd Rap., Mich.
So'n Div.: P. S. O'Rourke, *Supt.* Fort Wayne, Ind.
Grand Southern Ry. of New Brunswick.
4-8½ g. 82 m. 5 lo. 54 cars.
J. N. Greene, *Gen. Man* ..... St. George, N. B.
F. W. Holt, *Supt* .... St. George, N. B.
Thomas Logan, *M. M* .... St. George, N. B.
Grand Tower & Carbondale. 4-8½ g. 25 m. 6 lo. 357 c.
J. C. Simpson, *Supt.* .... Carbondale, Ill.
Hugh Smith, *M. M* .... Murphysboro, Ill.
O. L. Garrison, *Pur. Agt* ...... St. Louis, Mo
Grand Trunk Ry. 4-8½ g. 2,332 m. 660 lo. 16,330 c.
Joseph Hickson, *Gen. Man* .... Montreal, Can.
Wm. Wainright, *Asst. Gen. Man.* Montreal, Can.
Jno. Taylor, *Gen. Storekeeper* .. Montreal, Can.
Herbert Wallis, *Mech. Supt* .... Montreal, Can.
Wm. McWood, *Supt Car Dept.* .. Montreal, Can.
J. Harkom, *Ass. Mech. Supt* .. Richmond, P. Q.
A. H. Smith, *Ass. Mech. Supt* ... Toronto, Ont.
R. Boaz, *Asst. Mech. Supt* ..... Stratford, Ont.
F. L. Wanklyn, *Loco. Works* ... Montreal, Can.
Gt. West'n Div.: Chas. Stiff, *Supt* Hamilton, Ont.
E. Baines, *Store Kpr* .... London, Ont.
C. K. Domville, *Mech. Supt* .. Hamilton, Ont.
E. Mavor, *Asst Mch. Supt* ..... Hamilton, Ont.
J. D. McIlwain, *Supt. Car Dept* .. London, Ont.
Chi. & Gr. Trunk Ry. 4-8½ g. 339 m. 103 lo. 1,191 c.
W. J. Spicer, *Gen. Man* .... Detroit, Mich.
A. B. Atwater, *Supt* ...... Battle Creek, Mich.
J. F. Lorimer, *Storekeeper* ..... Detroit, Mich.
H. Roberts, *Mech. Supt* .... Detroit, Mich.
Midland of Can. 4-8½ g. 471 m. 44 lo. 1,423 c.
W. B. Ferguson, *Supt* ...... Peterboro, Ont.
J. D. Barnet, *Mech. Supt* .. Port Hope, Ont.
Det., Gr. H. & Mil. Ry. 4-8½ g. 189 m. 39 lo. 696 c.
W. J. Spicer, *Gen. Man* .... Detroit, Mich.
John S. Lorimer, *Storekeeper* ... Detroit, Mich.
W. J. Morgan, *Supt* .... Detroit, Mich.
H. Roberts, *Mech. Supt* ...... Port Huron, Mich.
Green Bay, Winona & St. Paul R. R.
4-8½ g. 250 m. 19 lo. 623 cars.
G. Campbell, *Gen. Man.. & P. A.* Green Bay, Wis.
A. Fenwick, *M. M* .... Ft. Howard, Wis.
Green Cove Spring & Melrose R.R. 3 g. 32 m. 1 lo. 11 c.
S. Ackley, *Pres* .... Philadelphia, Pa.
Greenwood, Laurens & Spart'g. 5 g. 4 lo.
J. N. Bass, *Supt* .... Augusta, Ga.
T. F Warwick, *M. M. & M. C. B.* Augusta, Ga.
Greenwich & Johnsonville Ry. 4-8½ g. 15 m. 1 lo. 7 c.
J. H. Thompson, *Supt* ...... Greenwich, N. Y.
Gulf, Col. & Santa Fé Ry. 4-8½ g. 536 m. 51 lo. 1,400 c.
Webster Snyder, *Gen. Man* .. Galveston, Texas.
Jno W. Thorne, *Pur. Agt* .... Galveston, Texas.
W. H. Reilly, *M. M & M. C. B.* Galveston, Texas.
H. J. Bearup, *Asst. M. M* ..... Galveston, Tex.
Gulf, W'n Texas & Pac. Ry. 4-8½ g. 68 m. 6 lo. 74 c.
M. D. Monserrate, *Supt. & Pur. Agt.* Cuero, Tex.
James Mooney *M. M* .... Cuero, Texas.

H

Hannibal & St. Jo. R. R. 4-8½ g. 292 m. 76 lo. 1,906 c.
J. F. Barnard, *Gen. Man* ...... St Joseph, Mo.
S. E. Crance, *Gen. Supt* .... Hannibal, Mo.
Wm. Irving, *Pur. Agt* .... Chicago, Ill
N. J Paradise, *Supt. M. M* ...... Hannibal, Mo.
G. M. Snryock, *M. C. B* .... Hannibal, Mo.
Hanover Branch R. R. 4-8½ g. 8 m. 2 lo. 18 cars
E. Y. Perry, *Supt* .... South Hanover, Mass
Hanover Junction, Hanover & Gettysburg R. R.
4-8½ g. 74 m. 10 lo. 140 cars.
H. D. Scott, *Gen. Supt* .... Gettysburg, Pa.
John J. Bingley *M. M* .... Hanover, Pa.
Jas. Harthorn, *M. C. B* .... Hanover, Pa.
Harrisburg & Potomac R. R. 4-8½ g. 41 m. 3 lo. 45 c.
R. H. Middleton, *Supt* ...... Boiling Springs, Pa.
Hartford & Conn. Val. R. R. 4-8½ g. 47 m. 9 lo. 196 c.
O. M. Shepard, *Supt* .... New Haven, Ct.
John Henry, Jr., *Supt M. P* .. Hartford, Conn.
Hartford & Conn. W'n R. R. 4-8½ g. 110 m. 16 lo. 495 c.
Edw McNeil, *Supt* .... Hartford, Ct.
Chas. H. Keane, *M. M* .... Hartford, Ct.
Hecla & Torch Lake R. R. 4-1 g. 5 m 5 lo. 165 cars.
W. A. Childs, *Gen. Man* .... Calumet, Mich.
Herkimer, Newport & Poland Ry.
3-6 g. 17 m. 2 lo. 24 cars.
Albert Wilber, *Supt* .... Herkimer, N. Y.
Hobart & Manistee River R. R. 3 g. 9 m. 2 lo. 42 c.
H. W. Marsh, *Supt* .... Hobart, Mich.
Hot Springs R. R. 3 g. 25 m. 3 lo. 39 cars.
J. S. Conger, *Supt* .... Hot Springs, Ark.
L. Finlay, *M. M* .... Malvern Ark.
Housatonic R. R. 4-8½ g. 126 m. 23 lo. 879 cars.
C. W. Wood, *Asst. Supt* ...... Bridgeport Ct
Pur. Agt .... Bridgeport, Ct.
N. Slingland, *M. M* .... Falls Village, Ct.
J. J. Ferris, *M. C. B* .... Falls Village, Ct.
Houston Belt Ry. 4-8½ and 3 gauge 16 miles.
S. L. Werden, *V. P. & Gen. Man.* Houston, Tex
Houston, East & West Tex. Ry. 3 g. 150 m. 10 lo. 570 c.
Paul Bremond, *Pr. & Pur. Agt* .. Houston, Tex.
E. L. Bremond, *Gen. Man* .... Houston, Tex.
Ed. Campbell, *M. M* .... Houston, Tex.
C. F. Schelewa, *M. C. B* ...... Houston, Texas.
Houston & Tex. Cen. Ry. 4-8½ g. 750 m. 78 lo. 2,526 c.
Geo. A. Quinlan, *Gen. Supt* ...... Houston, Tex.
A. H. Swanson, *Gen. Tr. Man* .... Houston, Tex.
L. C. Noble, *Gen. M. M.* .... Houston, Tex.
James McGee, *M. C. B* .... Houston, Tex.
So. & Wn. Divs.: M. G. Howe, *Supt.* Houston, Tex.
No. & Mi. Divs.: G. A. Quinlan, *Supt.*, and
C. H. Burns, *Asst. M. M* ..... Corsicana, Tex.
No.-Wn. Div: Donald Allen, *Supt* .... Waco, Tex.
Humeston & Shenandoah R. R.
4-8½ g. 113 m. 18 lo. 80 cars.
E. C. Murphy, *Gen. Man* .... Clarinda, Ia.
M. B. Snyder, *M. M* .... Shenandoah, Ia.
Huntingdon & Br. Top Mt. 4-8½ g. 65 m. 18 lo. 318 c.
Geo. F. Gage, *Gen. Man* ..... Huntingdon, Pa.
Samuel B. Knight, *Pur. Agt* .. Philadelphia, Pa.
William Barkla *M. M* .... Saxton Pa

I

Illinois Central R. R. 4-8½ g. 1,928 m. 334 lo. 8,565 c.
E. T. Jeffery, *Gen. Supt* .... Chicago Ill
O. Ott, *Pur. Agt* .... Chicago, Ill
Henry Schlacks, *Supt. of Mach* .... Chicago, Ill
W. B. Snow, *M. M. Car Works* ..... Chicago, Ill
(1) Ill. & Ia. Divs.: C. A. Beck, *Supt* ..... Chicago,
Chic. Div.: T. J. Hudson, *Supt* .... Cairo, Ill
Wm. Renshaw, *M. M* .... Chicago, Ill.
Mid. Div.: H. L. Frisbie, *Supt* ...... Pontiac, Ill.
Spring. Div.: W. Wilkinson, *Supt.* Springfield, Ill.
Wm. Griffin, *M. M* .... Clinton, Ill.
No'n Div.: J. C. Jacobs, *Supt* .... Amboy, Ill.
J. B. Edams, *M. M* .... Amboy, Ill.
Ia. Div.: M. Gilleas, *Supt* .... Dubuque, Ia.
Thos. W. Place, *M. M* .... Waterloo, Ia.
(2) So. Divs.: C. M. Sheafe, *Supt* .... New Orleans, La.
La. Div.: J. M. Turner, *Supt.* McComb City, Miss.
W. B. McKenna, *M. M* ... McComb City, Miss.
Miss. Div.: J. G. Mann, *Supt* ...... Jackson, Tenn.
J. F. White, *M. M* .... Water Valley, Miss.
Illinois Midland Ry. 4-8½ g. 176 m. 12 lo. 611 cars.
D. H. Conklin, *Rec. & Gen. Man* .... Decatur, Ill.
O. E. Grady, *Train Mast* .... Decatur, Ill.
Frank Young, *For. Shops* .... Paris, Ill.
Illinois & St. Louis R. R. 4-8½ g. 19 m. 10 lo. 450 c
C. H. Sharman, *Gen. Supt. & P. A.* St. Louis, Mo
D. J. Timlin, *M. M* .... Belleville, Ill.
Charles Rothe, *M. C. B* ...... E. St. Louis Ill
Indiana, Bloomington & Western Ry.
4-8¾ g. 826 m. 108 lo. 4,018 cars.
C. E. Henderson, *Gen. Man.* Indianapolis, Ind.
I. H. Wilson, *Gen. Supt* ..... Indianapolis, Ind.
H. C. Norton, *Pur. Agt* ...... Indianapolis, Ind.
Jos. S. Porter, *Div. M. M* .... Sandusky, O.
E. Hiserodt, *Gen. M. M* .... Indianapolis, Ind.
M Fogarty, *Div. M. M* .... Urbana, Ill.
W. B. Warren, *Div. M. M* ... Indianapolis, Ind.
Indiana, Illinois & Iowa R.R. 4-8½ g. 104 m. 5 lo. 83 c.
F. M. Drake, *Pres* .... Kankakee, Ill.
T. P. Shonts, *Gen. Supt* .... Kankakee, Ill.
R. C. Ackley, *M. M* .... Kankakee, Ill.
Indiana & Illinois Southern Ry. 3 g. 91 m. 3 lo. 69 c.
W. C. Lyon, *Gen. Man. & P. Agt.* Robinson, Ill.
J. S. Pickering, *M. M. & C. B.* Effingham, Ill.
Indianapolis, Decatur & Springfield Ry.
4-9 g. 152 m. 18 lo. 600 c.
Geo. Bender, *Supt* .... Indianapolis, Ind.
J. M. Kenno, *M. M* .... Indianapolis, Ind.
Indianapolis & Evansville Ry. 4-8½ g. 54 m.
D. J. Mackey, *Supt* .... Evansville, Ind.
Indianapolis & St. Louis R. R. (*See C., C., C. & I.*)
Indianapo. & Vincennes R.R. (*See Penna. Co.; (5) Div.*)
Intercolonial Ry. 4-8½ g. 873 m. 163 lo. 4,589 cars.
David Pottinger, *Chief Supt* ..... Moncton, N. B.
T. V. Cook, *Gen. Storekeeper* ... Moncton, N. B.
H. A. Whitney, *Mech Supt* ...... Moncton, N. B
Ewd. D. Shaffer, *M. C. B* .... Moncton, N. B.
M. & C. Dist.: J. E. Price, *Supt* Campbellton, N. B.
Hal. & St. J. Div.: J. J. Wallace, *Supt.* Truro, N. B.
Q. & St. F. Div.: A. R. McDonald, *Supt.* Riv. du Lp. Q.
International Ry. 4-8½ g. 69 m. 7 lo. 12 cars.
D. E. McFee, *Supt* .... Sherbrooke, P. Q.
J. Ruelle, *M. M* .... Sherbrooke, P. Q.
W. Charest, *M. C. B* .... Sherbrooke, P. Q.
International & Gt. N'n R. R. (*See Mo. Pac.; (5) Div.*)
Iowa Falls & Sioux City R. R. (*See Ill. Cen.*)
Iron Mountain & Helena R. R. (*See Mo. Pac.; (4) Div.*)
Ithaca, Auburn & Western Ry. (*See Southern Cen.*)

J

Jacksonville So.-E'n R. R. 4-8½ g. 54 m. 5 lo. 69
E. S. Greenleaf, *Supt* .... Jacksonville, Ill.
Ira F. Petrie, *M. M* .... Jacksonville, Ill.
Jacksonville, St. Augustine & Halifax River Ry.
3 g. 76 m. 3 lo. 27 cars
W. L. Crawford, *Gen. Man* .. Jacksonville, Fla.
E. T. Silvius, *M. M* .... Jacksonville, Fla.
Jacksonv., Pensacola & Mob. (*See Fla. Cent. & W.*)
Jacksonville, Tampa & Key West Ry. 5 g. 56 m.
G W. Bentley, *Gen. Man* .... Jacksonville, Fla.
M. R. Moran, *Supt* .... Jacksonville, Fla.
F. B Hurlbut, *M. C. B* ...... Jacksonville, Fla
Jamesville & Washington R. R. (*See Norfolk So'n.*)
Jeffersonv'l, Madison & Indpls. R. R. (*See (9) Pa. Co.*)
Jersey City & Albany R. R. 4-8½ g. 38 m.
J. W. McCulloh, *Manager* .... Jersey City, N. J.
Jersey City & Bergen R. R. 4-10 g. 21 m. 2 lo. 13 c.
T. M. Sayre, *Supt* .... Jersey City, N. J.
Jersey Shore, Pine Creek & Buff. Ry. (*See Phil. & R.*)
Junction & Breakwater R.R. (*See Del., Md. & Va.*

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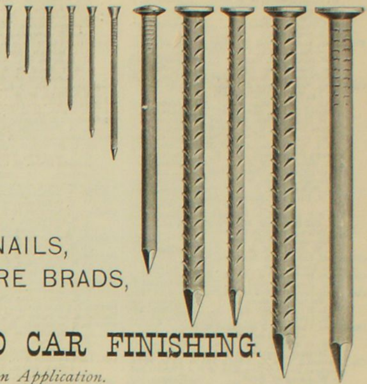

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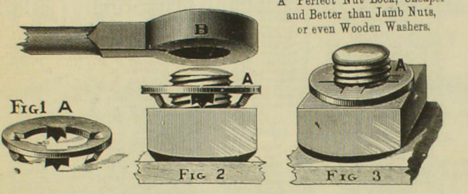

Fig1 A Fig 2 Fig 3

Fig. 1.—*A* represents nut lock detached. Fig. 2.—*A*, nut lock in position, ready to apply; *B*, the tool used in setting the lock—it is simply a bar of iron having a hole ⅛ inch larger than the bolt—when placed as indicated one or two smart blows with a hammer on the tool force the lock flat, the teeth entering the metal of the bolt. Fig 3.—*A* represents the lock applied.

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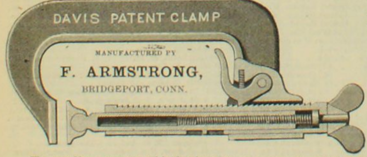

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" 3, " 7 "	12.00

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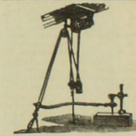

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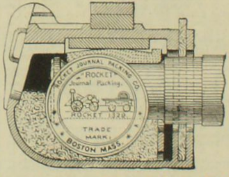

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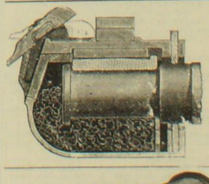

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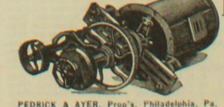

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L. B. FLANDERS MACHINE WORKS.

K

Kaaterskill R. R. 3 g. 8 m.
J. H. Jones, *Supt*........Rondout, N. Y.
Kansas Central R. R. (*See Union Pacific.*
Kansas City, Fort Scott & Gulf R. R.
4-8½ g. 389 m. 75 l. 2,037 c.
Geo. H. Nettleton, *Gen. Man.*.Kansas City, Mo.
L. W. Towne, *Supt*........Kansas City, Mo.
H. P. Jacques, *Pur. Agt*.....Kansas City, Mo.
J. S. McCrum, *M. M*........Kansas City, Mo.
A. N. Montier, *M. C. B*........Kansas City, Mo.
Kansas Cy, Lawrence & So. Kan. (*See At., Top. & S. F.*)
Kansas City, Springfield & Memphis R. R.
4-8½ g. 283 m. 10 lo. 456 cars.
George H. Nettleton, *Pres*....Kansas City, Mo.
L. W. Towne, *Supt*..........Kansas City, Mo.
H. P. Jacques, *Pur. Agt*......Kansas City, Mo.
J. S. McCrum, *M. M*........Kansas City, Mo.
A. N. Montier, *M. C. B*.......Kansas City, Mo.
Kansas City, St. Joseph & Council Bluffs; and St. Jo. & Des Moines R. Rs. 4-8½ & 3 g. 368 m. 41 lo. 1,148 c.
J. F. Barnard, *Gen. Man*.........St. Joseph, Mo.
J. R. Hardy, *Supt*........St. Joseph, Mo.
D. H. Winton, *Asst. Supt*......St. Joseph, Mo.
A. B. Barnard, *Asst. Supt*....Kansas City, Mo
Wm. Irving, *Pur. Agt*..........Chicago, Ill.
F. A. Chase, *M. M*........St. Joseph, Mo
Thos. Aylesbury *S. For. Car. Dep.*St. Joseph, Mo
Kansas City & Southern Ry. 4-8½ g. In progress.
Wm. Bailey, *Pres*...........Kansas City, Mo.
Kansas Coal Belt R. R. 4-8½ g. In progress.
C. H. Malin, *Gen. Man*...........Girard, Kan.
F. A. Hill, *Supt*..............Girard, Kan.
Kansas & Gulf Short Line R. R. 33 m. 2 lo. 32 cars.
Gen. Man..........Tyler, Tex.
V. K. Stevenson, *Pur. Agt*.....New York, N. Y.
Kent Northern Ry. 4-8½ g. 27 m. 2 lo. 16 cars.
J. C. Brown, *Gen. Man*.....Richibucto, N. B)
Kentucky Central R. R. (*See Ches. & Ohio*
Kentucky & South Atlantic Ry. 3 g. 23 m. 3 lo. 52 c.
Geo. B. Harper, *Supt. & P. A.*.Mt. Sterling, Ky
Geo. W. Lewis, *M. M*..........Mt. Sterling, Ky.
Keokuk & Des Moines R. R. (*See Chi., R. I. & Pac.*)
Kingston & Pembroke Ry. 4-8½ g. 104 m. 9 lo. 214 c.
B. W. Folger, *Supt*...........Kingston, Ont.
J. H. Taylor, *Pur. Agt*..........Kingston, Ont.
J. H. Taylor, *M. M*...........Kingston, Ont.
Knox & Lincoln R. R. 4-8½ g. 49 m. 6 lo. 119 cars.
C. A. Coombs, *Supt*.............Bath, Me.
Wm. A. Field, *M. M*..............Bath, Me.
C. L. Turner, *M. C. B*..............Bath, Me.
Knoxville & Augusta R. R. 5 g. 16 m. 2 lo. 34 cars.
R. N. Hood, *Gen. Man. & P. Agt.*Knoxville, Tenn
J. M. Hood, *Supt*..........Knoxville, Tenn.

L

Lackawanna & Pittsburgh R. R. 3 g. 97 m.
Geo. W. Chapman, *Rec*.........Angelica, N. Y.
J. F. O'Brien, *Gen. Man*........Angelica, N. Y.
Lake Champlain & Moriah R. R. 4-8½ g. 8 m. 8 lo. 222c.
E. B. Helding, *Supt*........Port Henry, N. Y.
Lake Erie & Western Ry. 4-8½ g. 388 m. 53 lo. 1,701 c.
J. H. Cheney, *Gen. Man*..... Bloomington, Ill.
D. S. Hill, *Gen. Supt*..........Bloomington, Ill.
T. H. Perry, *Pur. Agt*.........Bloomington, Ill.
H. L. Cooper, *Supt. of Equipment*....Lima, O.
Lake George & Muskegon River R. R.
4-8½ g. 20 m. 4 lo. 79 cars.
W. S. Gerrish, *Gen. Man*... Muskegon, Mich.
Lake Shore & Michigan So'n Ry.
4-8½ g. 1,340 m. 547 lo. 17,115 cars.
John Newell, *Pres*.................Cleveland, O.
P. P. Wright, *Gen. Supt*..........Cleveland, O.
L. G. Higgins, *Pur. Agt*...........Cleveland, O.
G. W. Stevens, *Supt. M. P*........Cleveland, O.
John Kirby, *Gen. M. C. B*.........Cleveland, O.
East'n Div.: C. B. Couch, *Supt*.....Cleveland, O.
J. S. Graham, *M. M*.............Buffalo, N. Y.
A. C. Robson, *M. C. B*..........Buffalo, N. Y.
L. O. Gassett, *M. M*...........Cleveland, O.
J. Withycombe, *M. C. B*.........Cleveland, O.
Frank. Div.: G. H. McIntire, *Supt.*Youngstown, O.
Toledo Div.: Thos. Flesher, Jr., *Supt.*Cleveland, O.
J. M. Sanborn, *M. M*..........Norwalk, O.
W. O. Smith, *M. C. B*..........Norwalk, O.
Mich. Divs.: J. E. Curtis, *Supt*.........Toledo, O.
Det. Brs.: T. J. Charlesworth, *Supt*. Detroit, Mich.
Lansing, Ypsilanti & Ft. Wayne Branches.
W. H. Caniff, *Supt*............Hillsdale, Mich.
Western Div.: A. G. Amsden, *Supt*...Chicago, Ill.
W. L. Gilmore, *M. M*.............Elkhart, Ind.
Frank O. Bray, *M. C. B*..........Adrian, Mich.
Gr. Rap. Br.: M. E. Wattles, *Supt.*Kalamazoo, Mich.
Lake Tahoe R. R. 3 g. 10 m. 3 lo. 49 cars.
D. L. Bliss, *Gen. Man*...........Carson, Nev.
John T. Rogers, *Gen. Supt*...... Carson, Nev
Tho. Morris, *M. M*.............Carson, Nev.
Leavenworth, Topeka & So. W'n Ry. (*See A. T. & S. F.*)
Lebanon Springs R. R. 4-8½ g. 58 m. 5 lo. 44 c.
W. C. Alstyne, *Gen. Man*.......Albany, N. Y.
W. H. Hawkins, *Pur. Agt*.......Albany, N. Y.
Geo. Tefft, *M. M*................Chatham, N. Y.
Lehigh Valley R. R. 4-8½ g. 495 m. 392 lo. 36,998 c.
H. S. Goodwin, *Gen. Supt*.......Bethlehem, Pa.
W. C. Alderson, *Pur. Agt*.....Philadelphia, Pa.
John I. Kinsey, *M. M*.............So. Easton, Pa.
John S. Lentz, *M. C. B*..........Packerton, Pa.
N. J. Div.: Jas. Donnelly, *Supt.* Perth Amboy, N. J.
Coal Rds.: J. I. Blakeslee, *Supt.* Mauch Chunk, Pa.
D. Clark, *M. M*..................Hazleton, Pa.
John Campbell, *M. M*................Delano, Pa.
B. M. Div.: A. G. Brodhead, *S.*.Mauch Chunk, Pa.
P. Hofecker, *M. M*...............Weatherly, Pa.
Wy. Div.: A. Mitchell, *S. & M. M.* Wilkesbarre, Pa.
Pa. & N. Y.; and Geneva, Ithaca & Sayre R. Rs.
Wm. Stevenson, *Gen. Supt*..........Sayre, Pa.
J. N. Weaver, *M. M*.............Sayre, Pa.
Jno S. Lentz, *M. C. B*...........Packerton, Pa.
Lehigh & Hudson River Ry. 4-8½ g. 63 m. 8 lo. 350 c.
Grinnell Burt, *Gen. Man*........Warwick, N. Y.
N. L. Furman, *Supt*...........Warwick, N. Y.
John Sayre, *Pur. Agt*..........Warwick, N. Y.
S. Mills, *M. M*..............Warwick, N. Y.
Lehigh & Lackawanna and Lehigh & Susquehanna R. Rs. (*See Phil. & Read.; N. J. Cen. Div.*)
Levis & Kennebec R. R. (*See Quebec Cen.*)
Litchfield, Carrollton & Western R. R. 4-8½ g. 22 m.
H. S. Carroll, *Prest. & G. Man.*.Carrollton, Ill.
Ligonier Valley R. R. 4-9 g. 11 m. 2 lo. 22 cars.
Thos. A. Mellon, *Gen. Manager*. Pittsburgh, Pa.
Geo. Senft, *Supt. & P. Agt*........Latrobe, Pa.
Little Miami R. R. (*See Penna. Co.'s Rds.; (8) Div.*)
Little Rock, Miss. River & Texas Ry.
4-8½ g. 170 m. 12 lo. 299 cars.
H. Wood, *Gen. Man*.........Little Rock, Ark.
F. A. Lister, *Gen. Supt*........Little Rock, Ark.
F. Hufsmith, *M. M. & C. B*.........Argenta, Ark.
Little Rock & Fort Smith. 4-8½ g. 170 m. 13 lo. 360 c
Hy. Wood, *Gen. Man*..........Little Rock, Ark.
F. A. Lister, *Supt*...........Little Rock, Ark.
F. Hufsmith, *M. M. & M. C. B*.....Argenta, Ark.
Little Saw Mill Run R. R. 3 & 4-8½ g. 8 m. 4 lo. 327 c.
T. Hartley, *Gen. Man*...........Banksville, Pa.
Long Island R. R. 4-8½ g. 352 m. 92 lo. 953 cars.
I. D. Barton, *Gen. Supt.* Long Island City, N. Y
Benj. Norton, *Pur. Agt.* Long Island City, N. Y.
C. A. Thompson, *M. M.* Long Island City, N. Y.
Longview & Sabine Valley R. R. (*See Gal. Sab. & St. L.*)
Louisiana W'n R. R. (*See Cen. Pac.; G., H. & S. A. Div.*)
Louisville, Cin. & Lexington R. R. (*See Louis. & N.*)
Louis., Evans. & St. L. Ry. 4-8½ g. 254 m. 24 lo. 1,032 c.
Geo. F. Evans, *Rec*..............Louisville, Ky.
R. S. Minor, *Gen. Supt*..........Louisville, Ky.
F. P. Boatman, *M. M*...........Evansville, Ind.
Louisville, New Albany & Chicago Ry.
4-8½ g. 479 miles 60 lo. 3,700 cars.
John B. Carson, *Gen. Man*.......Chicago, Ill
W. R. Woodard, *Gen. Supt*.......Chicago, Ill.
H. O. Nourse, *Pur. Agt*........Chicago, Ill.
Josiah Bettis, *M. M*...........New Albany, Ind.
Chas. Coller, *M. C. B*..........New Albany, Ind.
C. C. F. Bent, *Supt. Trans*......Lafayette, Ind.
Louisville, New Orleans & Tex. Ry. 455 m. In progress.
Jas M. Edwards, *Gen. Man*...Memphis, Tenn.
M. Burke, *Gen. Supt*...........Memphis, Tenn.
John Bradley, *Asst. Supt*.....New Orleans, La.
A. M. Cooke, *Pur. Agt*.........Memphis, Tenn.
E. D. Anderson, *M. M*.........Vicksburg, Miss.
J. J. Casey, *M. C. B*..........Vicksburg, Miss

Louisville & Nashville R. R.
5 g. 2,186 m. 380 lo. 12,197 cars.
J. A. Harrahan, *Gen. Man*.....Louisville, Ky.
J. T. Harahan, *Asst Gen. M*....Louisville, Ky.
Geo. F. Evans, *Supt*...........Louisville, Ky.
P. P. Huston, *Pur Agt*..........Louisville, Ky.
Harvey Middleton, *Supt. Mach.*.Louisville, Ky.
Louisv., Cin. & Lex. Divs.:
J. G. Metcalf, *Supt. Trans*..... Louisville, Ky.
P. Leeds, *M. M*...............Louisville, Ky.
J. W. Luttrell, *M. M*..........Louisville, Ky.
J. G. Clifford, *M. M.* (2d & C. Div.). Bowling Grn. Ky.
Henderson Div.: J. Geddes, *Supt*. Henderson, Ky.
W. P. Pike, *M. M*...............Nashville, Tenn.
Nash. & D. Div.: J. Geddes, *Supt.* Nashville, Tenn.
Elkton & Guthrie:
J. Geddes, *Supt*...........Nashville, Tenn.
S. & N. A. Div.: Levi Hedge, *Supt.* Birmingham, Ala.
C. W. White, *M. M*.........Birmingham, Ala.
Mob. & M.; N. Div. Pens. & Sel.; Sl. & Mont. R. Rs.:
B. C. Epperson, *Supt*......Montgomery, Ala.
J. N. Hall, *M. M.* (Mont. Shops). Montgomery, Ala.
N. O. Div.: O. M. Dunn, *Supt*...New Orleans, La.
Wm. Adair, *M. M*..................Mobile, Ala.
Memp. Div.: W. Colcamp, *Supt*. Memphis, Tenn.
J. V. Slusser, *M. M*...........Memphis, Tenn.
St. L. Div.: C. O. Parker, *Supt.* Montgomery, Ala.
Thos. Walsh, *M. M*...........Mt. Vernon, Ill.
Pensacola and So. Div. Pens. & Selma and P. & A. Rds.:
E. O. Saltmarsh, *Supt*..........Pensacola, Fla.
W. D. Robb, *M. M*..............Pensacola, Fla.
Louisville & Wadley R. R. 5 g. 10 m. 1 lo. 5 c.
J. H. Wilkins, *Supt. & Pur. Agt.* Louisville, Ga.

M

Macon & Brunswick R. R.
(*See E. Tenn., Vir. & Ga.; At. & Ga. Divs.*)
Maine Central R. R. 4-8½ g. 525 m. 82 lo. 2,168 c.
Payson Tucker, *Gen. Man*........Portland, Me.
Amos Pillsbury, *M. M*.........Waterville, Me.
C. H. Kenison, *M. C. B*..........Augusta, Me.
Eastern Maine. 3 g. 19 m. 2 lo. 40 c.
L. L. Lincoln, *Supt*...........Portland, Me.
Manchester & Keene R. R. 4-8½ g. 30 m. (*See Concord.*)
Manchester & Lawrence R. R. (*See Concord.*)
Manchester & North Weare R. R. (*See Concord.*)
Manhattan Ry. 4-8½ g. 32 m. 228 lo. 652 pass. c.
Frank K. Hain, *Gen. Man*.....New York, N. Y.
W. T. Goundie, *Supt. Trans*. New York, N. Y.
T. W. Peeples, *M. M*..........New York, N. Y.
H. A. Webster, *M. C. B*........New York, N. Y.
Manitoba Southwestern Colonization Ry.
4-8½ g. 52 m. 3 lo. 125 cars.
J. M. Eagan, *V. Pres*...........Winnipeg, Man.
W. T. Reed, *M. M*.............Winnipeg, Man.
Marietta & Cincinnati R. R. (*See Cin. Wash. & Balt.*)
Marietta & North Georgia R. R. 3 g. 70 m. 4 lo. 45 c.
J. B. Glover, *Gen. Man*.........Marietta, Ga.
W. R. Power, *Pur. Agt*..........Marietta, Ga.
C. Chester, *M. M*................Marietta, Ga.
Marquette, Houghton & Ontonagon R. R.
4-8½ g. 100 m. 42 lo. 2,530 cars.
John Hornby, *Gen. Man*.......Marquette, Mich.
W. A. Thompson, *Ass't Supt*. Marquette, Mich.
M. B. McGee, *Pur. Agt*......Marquette, Mich.
W. A. Mahan, *M. M*..........Marquette, Mich.
H. D. Lyons, *M. C. B*.........Marquette, Mich.
Maryland Central R. R. 3 g. 27 m. 4 lo. 56 cars.
S. G. Boyd, *Supt*...............Baltimore, Md.
Marquette & Western. 4-8½ g. 25 m. 10 l. 500 c.
D. McCool, *Gen. Supt*........Marquette, Mich.
W. J. Tench, *Pur. Agt*......Marquette, Mich.
J. B. Wilson, *Mech. Supt*......Marquette, Mich.
Massachusetts Central R. R. 4-8½ g. 48 m. 5 l. 81 c.
E. G. Allen, *Supt. & Pur. Agt*....Boston, Mass.
E. A. Walker, *M. M*........So. Sudbury, Mass.
Memphis & Charleston R. R. (*See E. Tenn. Va. & Ga.*.
Memphis & Lit. Rock R. R. 5 g. 135 m. 14 lo. 299 c.
R. Fink, *G. Man. & P. A*......Little Rock, Ark.
Supt..........Memphis, Tenn.
Thos. Rennell, *M. M*.............Argenta, Ark.
T. Rennell, *M. C. B*...............Argenta, Ark.
Mexican Ry. 4-8½ g. 293 m. 42 lo. 616 cars.
E. W. Jackson, *Gen. Man*.......Mexico, Mex.
Geo. Foote, *Gen Supt*...........Mexico, Mex.
Mexican Central Ry. 4-8½ g. 1,224 m. 94 lo. 2,609 c.
Theo. Nickerson, *Pur. Agt*......Boston, Mass.
E. W. Jackson, *Gen. Man*...El Paso del Norte.
D. MacKenzie, *Gen. Supt*......City of Mexico.
F. W. Johnstone, *Supt. M. P. & M.* City of Mexico.
J. H. O'Brien, *M. M*.........City of Mexico.
G. T. Jarvis, *Div. Supt*.........City of Mexico.
A. Smith, *Div. Supt*..............Silao, Mex.
I. A. Eacott, *Div. Supt*.......Jimulco, Mex.
R. E. Comfort, *Div. Supt*..Paso del Norte, Mex.
R. S. Simpson, *M. M*..........City of Mexico.
A. Hendee, *M. M*...............Calera, Mex.
C. F. Stewart, *M. M*...............Silao, Mex.
W. L. Wallace, *M. M*.............Jimulco, Mex.
J. G. McCuen, *M. M*..........Chihuahua, Mex.
Tampico Div: E. A. Whort, *Supt*. Tampico, Mex.
San Blas Div.: C. E. Payne, *Supt*..San Blas, Mex.
Mexican National Ry. 3 g. 766 m. 50 lo. 1,283 c.
Northern General Division:
D. C. Dodge, *V. P. & Gen. Man*...Laredo, Tex
C. A. Merriam, *Gen. Supt*.......Laredo, Tex.
F. W. Baldwin, *Asst. Gen. Supt*..Laredo, Tex.
John Grace, *M. M*..............Laredo, Tex.
T. Milan, *M. M*............Corpus Christi, Tex.
Metamoras, Div.:
W. W. Mayberry, *Asst. Supt*..Brownsville, Tex.
Galveston Div.:
T. E. Quinn, *Asst. Supt*......Galveston, Tex.
Southern General Division:
W. E. Lewis, *Supt*............Mexico, Mex.
R. C. Peebles, *Asst. Supt*........Mexico, Mex.
J. M. Winslow, *M. M*............Mexico, Mex.
Zacatecas Div.:
C. Langrand, *Manager*........Zacatecas, Mex.
Michigan Cen. R. R. 4-8½ g. 1,485 m. 357 lo. 11,284 c.
H. B. Ledyard, *Pres. & Gen. Man.* Detroit, Mich.
E. C. Brown, *Gen. Supt*..........Detroit, Mich.
Robert Miller, *Asst. Gen. Supt*...Detroit, Mich.
Allan Bourn, *Pur. Agt*...........Detroit, Mich.
C. E. Smart, *Gen. M. M*.........Jackson, Mich.
(1) Lines West of Detroit River:
E. C. Brown, *Gen. Supt*........Detroit, Mich.
East. Div.: D. S. Sutherland, *Supt*. Detroit, Mich.
Bay City, Saginaw & Mackinaw Divisions.:
W. A. Vaughan, *Supt*.........Bay City, Mich.
C. E. Smart, *M. M*..............Bay City, Mich.
Main Line: Gr. Rap.; So. Bend; and So. Hav. Divs.:
C. B. Bush, *Supt*..............Jackson, Mich.
W'n Divs.: R. H. L'Hommedieu, *Supt.* Chicago, Ill.
(2) Lines East of Detroit River:
J. B. Morford, *Supt*.........St. Thomas, Ont.
A. F. Bull, *M. M*............St. Thomas, Ont.
Rob't Potts, *M. C. B*.........St. Thomas, Ont.
Michigan & Ohio.
L. A. Latcha, *Gen. Man*..............Toledo, O.
W. L. Webb, *Pur. Agt*..............Toledo, O.
D. J. Durrell, *M. M*.......... Marshall, Mich.
Middleburg & Schoharie; and Schoharie Valley R. Rs. 4-8½ g. 11 m. 2 lo. 6 cars.
P. S. Danforth, *Gen. Supt*... Middleburg, N. Y.
Midland of Canada. (*See Grand Trunk.*)
Midland No. Carolina Ry. 5 g. 95 m. 9 lo. 82 cars.
Atlantic & North Carolina Ry. 22 m.
John D. Whitford, *Gen. Man*..Newbern, N. C.
J. A. Bryan, *Supt*...............Newbern, N. C
D. J. Sprague, *Pur. Agt*.......New York, N. Y.
B. Manly, *Supt. of Mach*....... Newbern, N. C.
Milford & Woonsocket.
W. W. Jencks, *Supt*............ Milford, Mass.
Milton & Sutherlin. (*Oper. by Rich. & Danville.*)
Milwaukee, Lake Shore & Western Ry.
4-8½ g. 370 m. 45 lo. 1,536 cars.
H. F. Whitcomb, *Gen. Supt*...Milwaukee, Wis
J. Donahue, *Supt*..............Milwaukee, Wis.
John Hickey, *M. M*...............Ledyard, Wis.
Milwaukee & Northern and Wisconsin & Michigan R. Rds. 4-8½ g. 228 m. 24 l. 703 cars.
C. F. Dutton, *Gen. Supt*.......Milwaukee, Wis.
N. S. Kimball, *M. M*.........Ft. Howard, Wis.
Mineral Range R. R. 3 g. 13 m. 4 lo. 43 cars
Chas. E. Holland, *Pr. & Supt*...Hancock, Mich.
C. A. Wright, *Gen. Man*.........Hancock, Mich.
W. H. Carr, *Pur. Agt*...........Hancock, Mich.
T. J. Shellhorn, *M. M. & C. B*..Hancock, Mich.

Minnesota & Northwestern.
R. Du Puy, *Supt*.............. St. Paul, Minn.
Minneapolis, Lyndale & Minnetonka Ry.
3 g. 25 miles 4 motors 1 lo. 35 cars.
William McCrory, *Man*.....Minneapolis, Minn.
T. W. Heintzelman, *M. M*.. Minneapolis, Minn.
Minneapolis, S. Ste. Marie & Atlantic Ry.
4-8½ g. 45 m.
W. W. Rich, *Supt*...........Minneapolis, Minn.
Minneapolis & St. Louis Ry.
4-8½ g. 560 m. 72 lo. 2,060 c.
W. H. Truesdale, *V. Pres*..Minneapolis, Minn.
T. E. Clarke, *Gen. Supt*....Minneapolis, Minn.
W. B. Palmer, *Pur. Agent*. Minneapolis, Minn.
G. F. Wilson, *M. M. & M. C. B.* Minneapolis, Minn
Missisquoi R. R. 4-8 g. 28 m.
W. C. Smith, *Man*.............St. Albans, Vt.
Mississippi, Terre aux Boeufs & Lake R. R.
29 miles.
M. R. Spelman, *Supt*.........New Orleans, La.
Mississippi & Tenn. R. R. 4-8½ g. 101 m. 12 lo. 194 c.
Jas. M. Edwards, *Gen. Man*....Memphis, Tenn.
J. C. Ramsey, *M. M*..........Memphis, Tenn.
S. J. Bolton, *M. C. B*...........Memphis, Tenn.
Missouri, Iowa & Nebraska R. R. 4-8½ g. 143 m.
H. T. Clark, *Supt*............Alexandria, Mo.
Missouri, Kansas & Texas Ry. (*See Mo. Pac.; (2) Div.*)
Missouri Pacific Ry. (Leased and operated lines.)
4-8½ g. 6,029 m. 697 lo. 19,748 cars.
H. M. Hoxie, *3d V. Pres*........St. Louis, Mo.
Wm. Kerrigan, *Gen. Supt*..... St. Louis, Mo.
R. B. Lyle, *Pur. Agt*..........St. Louis, Mo.
(1), (2) and (3) Divs.:
John Hodge, *Supt. Car Dep*.......St. Louis, Mo.
(4), (5) and (6) Divs.:
O. A. Haynes, *Insp. L. C. & M*...St. Louis, Mo.
(1) Missouri Pacific Ry. 1,028 m. 155 lo. 4,218 cars.
E. K. Sibley, *Supt*................Sedalia, Mo.
T. W. Newell, *M. M*..............Sedalia, Mo.
E. Taylor, *Asst M. M*.............Sedalia, Mo.
W'n Div.: Sedalia, Mo.
L. Bartlett, *M. M*................St. Louis, Mo.
(2) Mo., Kan. & Tex. Ry. 1,308 m. 140 lo. 4,248 cars.
Jos. Herrin, *Supt*...............Sedalia, Mo.
J. J. Frey, *Div. Supt*............ Sedalia, Mo.
T. G. Golden, *Div. Supt*.........Parsons, Kan.
S. Irvin, *Asst. Supt. Car Dep*...... Sedalia, Mo.
E. K. Sibley, *Supt*...............Parsons, Kan.
W. E. Phillips, *M. M*..............Parsons, Kan.
(3) Central Branch Un. Pac. R. R. 388 m. 30 lo. 599 c.
W. W. Fagan, *Supt*..............Atchison, Kan.
H. V. Faries, *M. M*..............Atchison, Kan.
J. W. Blackburn, *A. Supt. Car D.*.Atchison, Kan.
(4) St. L., I. Mt. & So'n Ry. 905 m. 138 lo. 4,928 c.
H. G. Fleming, *Supt*...........St. Louis, Mo.
St. Louis Div.: W. H. Harris, *M. M*..De Soto, Mo.
Ark. Div.: *Supt*......Little Rock, Ark.
R. M. Richardson, *M. M*....Little Rock, Ark.
(5) Int. & G. No.: *Supt*..Palestine, Tex.
M. M...........Palestine, Tex.
(6) Tex. & Pac: Warder Cumming, *Supt*. Marshall, Tex.
E. N. O. & Tr. Cont. Divs.:
Geo. Dimick, *Supt*..............Marshall, Tex.
E. R. Smith, *M. M. & M. C. B*..N. Orleans, La.
Rio Grande Div.:
L. L. Keller, *Supt*..........Big Springs, Tex.
Mobile & Ala. Grand Trunk R. R. 5 g. 59 m. 2 lo. 23 c.
Wm. H. Pratt, *Trustee*................Mobile, Ala.
Mobile & Girard R. R. 5 g. 84 m. 7 lo. 112 cars
W. L. Clark, *Gen. Supt*..........Columbus, Ga.
J. C. Albrecht, *M. M*............Columbus, Ga.
A. J. Nix, *M. C. B*...............Columbus, Ga.
Mobile & Montgomery Ry. (*See Louis. & Nash.*)
Mobile & Northwestern R. R. 3 g. 31 m. 2 lo. 16 c.
Thomas T. A. Lyon, *Pres*.......Glendale, Miss.
Mobile & Ohio R. R. 5 g. 528 m. 75 lo. 1,353 cars.
T. M. R. Talcott, *V.-Pr. & Gen. Man* Mobile, Ala.
J. G. Motley, *Gen. Supt*...........Mobile, Ala.
F. Jordan, *Pur. Agt*..............Mobile, Ala.
M. T. Carson, *Gen. M. M*..........Whistler, Ala.
J. T. Booth, *M. C. B*.............Whistler, Ala.
So'n Div.:............................Mobile, Ala.
L. J. Morris, *M. M*...............Macon, Miss.
No'n Div.: E. S. Hosford, *Supt*.. Jackson, Tenn.
H. C. Goode, *M. M*............Jackson, Tenn.
Mobile & Spring Hill R. R. 5-2 g. 8 m. 1 lo. 16 cars.
F. Ingate, *Manager*................Mobile, Ala.
Moline & Southeastern R. R. 3-6 g. 8 m. 2 lo. 26 c.
R. Battersly, *Gen. Man*.........Coal Valley, Ill.
Mont Alto R. R. 4-9 g. 21 m. 2 lo. 8 cars.
G. B. Wiestling, *Supt. & P. A*....Mont Alto, Pa.
Montgomery & Eufaula Ry. (*See Cen. of Ga.*)
Montgomery Southern Ry. 3 g. 20 m. 1 lo. 15 cars.
S. D. Hubbard, Jr., *Gen. Man.* Montgomery, Ala.
Montour R. R. 4-8½ g. 12 m. 2 lo. 130 cars.
C. R. Brown, *Supt. & Pur. Agt*...Imperial, Pa.
Henry Newman, *M. C. B*........Imperial, Pa.
Montpelier & Wells Riv. R. R. 4-8½ g. 38 m. 3 lo. 86c.
W. A. Stowell, *Supt*............Montpelier, Vt.
Montreal Portland & Boston Ry. (*See Passumpsic.*)
Montreal & Sorel Ry. 4-8½ g. 47 m. 3 lo. 35 c.
C. N. Armstrong, *G. M. & Pur. Agt*. Sorel, P. Q.
J. F. Armstrong, *Gen. Supt*.........Sorel, P. Q.
G. W. Pangborn, *M. M*...........Sorel, P. Q.
Montrose Ry. 3 g. 28 m. 3 lo. 24 cars.
T. G. Walter, *Gen. Supt*... Tunkhannock, Pa.
Morgan's Louis. & Tex. R. R. 4-8½ g. 260 m. 46 l. 1,339 c.
J. Kruttschnitt, *Supt*.........New Orleans, La.
C. Trumpy, *Pur. Agt*........ New Orleans, La.
J. D. Connell, *M. M*..............Algiers, La.
Jno. Hildebrand, *M. C. B*.........Algiers, La.
Mount Washington R. R. 5-3 g. 3 m. 6 lo. 6 cars.
Walter Aiken *Gen. Man*........Franklin, N. H.

N

Nantasket Beach R. R. 4-8½ g. 6 m. 5 lo. 25 c.
George L. Keyes, *Gen. Supt*......Boston, Mass.
Naugatuck R. R. 4-8½ g. 62 m. 17 lo. 547 cars.
Geo. W. Beach, *Supt*.........Waterbury, Conn.
H. A. Bishop, *Asst. Supt*... Bridgeport, Conn.
H'y D. Beach, *Supt. R. S*....Bridgeport, Conn.
Napanee, Tamworth & Quebec Ry. In progress.
Ed. W. Rathbun, *Gen. Man*....Deseronto, Ont.
R. C. Carter, *Asst. Gen. Man*..Deseronto, Ont.
Narragansett Pier R. R. 4-8½ g. 8 m. 2 lo. 11 c.
G. T. Lanphear, *Supt. & Pur. Agt.* Peacedale, R. I.
Nashua & Rochester R. R. (*See Wor. & Nash.*)
Nashville, Chattanooga & St. Louis Ry.
5 g. 539 miles 87 lo. 1,979 cars.
J. W. Thomas, *G. Man. & P. Agt.* Nashville, Tenn.
M. J. C. Wrenne, *Supt*.........Nashville, Tenn.
James Cullen, *M. M. & C. B*...Nashville, Tenn.
Nashville & Florence R. R. 5 g. 51 m.
J. Geddes, *Supt*...............Columbia, Tenn.
Natchez, Jackson & Col. R. R. 3-6 g. 100 m. 7 lo. 92 c.
E. D. Frost, *Gen. Supt*.......... Natchez, Miss.
Nebraska, Topeka, Iola & Memphis R. R. 4-8½ g. 16 m.
H. M. Clarke, *Gen. Man*..........Girard, Kan.
C. H. Malin, *Gen. Supt*.........Girard, Kan.
New Brunswick Ry. 4-8½ g. 447 m. 40 lo. 935 cars.
F. W. Cram, *G. M. & Pur. Agt*..St John, N. B.
Geo. A. Haggerty, *M. M*........McAdam, N. B.
Jas. Jackson, *Asst. M. M*......McAdam, N. B.
New Brunswick & Can. Ry. (*See New Brun.*)
Newburg, Dutchess & Conn. R. R. 4-8½ g. 58 m.
C. L. Kimball, *Supt. & P. Agt.* Matteawan, N. Y.
G. D. Holmes, *M. M. & M. C. B.* Matteawan, N. Y.
New Castle R. R. 3-6 g. 5 m. 2 lo. 76 cars.
Geo. Pearson, *Gen. Man*.......New Castle, Pa.
New Castle & Beaver Valley R. R. (*See Penna. Co.*)
New Haven & Derby R. R. 4-8½ g. 13 m. 4 lo. 70 c.
E. S. Quintard, *Supt*..........New Haven, Conn.
J. M. Whitlock, *M. M. & C. B.* New Haven, Conn.
New Haven & No'mpton. 4-8½ g. 170 m. 28 lo. 579 c
S. B. Opdyke, Jr., *Supt*.........New Haven, Ct.
R. G. Curtis, *Pur. Agt*..........New Haven, Ct.
Henry Fox, *M. M*................New Haven, Ct.
John Sweeny, *For Car. Shps*...New Haven, Ct.
New Jersey & New York Ry. 4-8½ g. 37 m. 6 lo. 40 c.
J. D. Hasbrouck, *Gen. Man* Jersey City, N. J.
J. S. Drake, *Supt. & M. M*.......Hillsdale, N. J.
L. B. Van Wagonen, *M. C. B*....Hillsdale, N. J.
N. J. Southern Ry. (*See Phil. & Read.; N. J. So. Div.*)
New London Northern R. R. (*See Central Ver.*)
New Orleans, B. Rouge, Vicks. & Memphis.
Jas. M. Edwards, *Gen. Man*..New Orleans, La.
John Bradley, *Supt*..........New Orleans, La.
New Orleans Pacific Ry. (*See Mo. Pac.; (6) Div.*)

New Orleans & Carrollton R. R.
4-8½ g. 15 m. 12 lo. 79 cars.
C. V. Halle, *Supt*............New Orleans, La.
John Dahmer, *M. M*..........New Orleans, La.
Jas. Thorn, *M. C. B*...........New Orleans, La.
New Orleans & Mobile R. R. (*See Louis. & Nash.*)
N. O. & Northeastern R. R. (*See Cin., N. O. & Tex. Pac.*)
New Orleans & Selma R. R. 5 g. 21 m. 1 lo. 8 cars.
L. B. Schofield, Supt..............Selma, Ala.
Newport & Wickford R. R. 4-8½ g. 22 m.
Theo. Warren, *Supt*............Newport, R. I.
Nevada Central R. R.:
C. W. Hinchcliffe, *Rec. & Supt*...Austin, Nev.
Louis Parisoe, *M. M*.....Battle Mountain, Nev.
J. B. Gilchrist, *Pur. Agt*.........Austin, Nev.
Nevada County N. G. R. R. 3 g. 23 m. 3 lo. 46 cars.
John F. Kidder, *Supt*........Grass Valley, Cal.
Jas. McCormick, *M. M. & C. B.* Grass Valley, Cal.
Nevada & Oregon R. R. 3 g. 30 m. 25 cars.
D. W. Balch, *Supt*.................Reno, Nev.
N. Y. Central & Hudson River R. R.
4-8½ g. 983 m. 676 lo. 25,161 cars.
J. M. Toucey, *Gen. Supt*...... New York, N. Y.
Theo. Voorhees, *Asst. Gen. Supt*. New York, N. Y.
Chas. Reed, *Pur. Agt*........ New York, N. Y.
Wm. Buchanan, *Supt. M. P. and R. Stock*, New York, N. Y.
N. Y. & Har. Div.: C. M. Bissell, *Supt.* do.
P. McQ. Gibson, *M. M*.......New York, N. Y.
Hud. Riv. Div.: C. M. Bissell, *Supt.* N. York, N. Y.
W. H. Wolfrath, *M. C. B*....New York, N. Y.
E'n Div.: Zenas C. Priest, *Supt.* Lttle Falls, N. Y.
John Ortton, *M. M*.......West Albany, N. Y.
L. Packard, *M. C. B*......West Albany, N. Y.
W'n Div.: Geo. H. Burrows, *Supt*...Buffalo, N. Y.
S. L. White, *M. M*............Syracuse, N. Y.
Amos Gould, *M. M*.........E. Buffalo, N. Y.
E. Chamberlain, *M. C. B*... E. Buffalo, N. Y.
Peter Smith, *M. C. B*..... E. Rochester, N. Y.
Rd. Donaby, *M. C. B*....Niagara Falls, N. Y
N. Y. Chic. & St. L. Ry. 4-8½ g. 524 m. 108 lo. 7,245 c
Lewis Williams, *Gen. Man*...... Cleveland, O
M. M. Rogers, *Pur. Agt*..........Cleveland, O
Jno. Mackenzie, *Supt. M. P*......Cleveland, O
Eas'tn Div.: G. H. Kimball, *Supt*...Cleveland, O
E. A. Miller, *M. M*...............Conneaut, O
West'n Div.: C. D. Gorham, *Supt*....Chicago, Ill.
W. H. Lewis, *M. M*.............Englewood, Ill.
New York City & Northern. 4-8½ g. 58 m. 17 lo. 368 c
Frank S. Gannon, *Gen. Supt.* High Bridge, N. Y
Thos. Millen, *M. M*..........High Bridge, N. Y.
New York, Lackawanna & W'n Ry. (*See Del. L. & W.*)
New York, Lake Erie & Western R. R.
S. M. Felton, Jr., *V. Pr*...... New York, N. Y.
(1) N. Y., L. E. & W. Div.: 4-8½ g. 1,073 m. 576 lo. 30,553 c.
B. Thomas, *Gen. Supt*.........Jersey City, N. J.
W. G. Tuller, *Pur. Agt*.........New York, N. Y.
F. M. Wilder, *Supt. M. P. & M*...Susqueh'a, Pa.
E'n Div.: E. O. Hill, *Supt*.......Jersey City, N. J.
J. H. Vreeland, *M. M*...... Jersey City, N. J.
J. N. Mileham, *M. C. B*.....Jersey City, N. J.
Del. Div.: E. Van Etten, *Supt*..Port Jervis, N. Y.
J. Van Vechten, *M. M. & C. B.* Pt. Jervis, N. Y.
Susq. Div.: R. B. Cable, *Act. Supt*..Elmira, N. Y
V. Blackburn, *M. M*..........Susquehanna, Pa
D. B. Goodell, *M. C. B*..........Elmira, N. Y.
Buf. & R. Divs.: W. J. Murphy, *Supt.*; and
Wm. Litz, *M. M*..................Buffalo, N. Y.
Robert Gunn, *M. C. B*.......... Buffalo, N. Y.
B. & S.-W. Div.: C. A. Brunn, *Supt.* do.
W'n Div.: W. B. Coffin, *Supt*..Hornellsville, N. Y
J. Hawthorne, *M. M*.......Hornellsville, N. Y.
N. Y. & Greenwood L. Ry. 4-8½ g. 44 m. 8 lo. 53 c.
Stephen Smith, *Supt*.........Jersey City, N. J.
F. A. Stinard, *M. M*..............Pompton, N. J.
(2) N. Y., Pa & O. Div.: 4-8½ g. 565 m. 221 lo. 7,794 c.
W. M. Clements, *Gen. Supt*..Cleveland, Ohio.
J. H. Holway, *Pur. Agt*.......Cleveland, Ohio.
Wm. Fuller, *Supt. M. P*.........Cleveland, O.
S. V. Smith, *Asst. Gen. M. C. B*....Kent, Ohio.
E'n Div.: A. L. Dunbar, *Supt*.......Meadville, Pa.
J. A. Cooper, *M. M*...........Meadville, Pa.
D. S. Dockstader, *M. C. Rep*...Meadville, Pa
W'n Div.: A. M. Tucker, *Supt*.......... Galion, O.
Wm Hill, *M. M*.......................Galion, O.
Geo. Wilson, *For. Car Rep*.....Galion, Ohio
Maho'g Div.: N. F. Wood, *Supt*......Cleveland, O.
N. Wright, *M. M*................Cleveland, O.
C. N. Thorp, *M. C. Rep*...........Cleveland, O
New York, New Haven & Hartford R. R.
4-8½ g. 203 m. 123 lo. 2,768 cars.
E. M. Reed, *V. P. & Gen. Supt.* New Haven, Ct.
R. N. Dowd, *Pur. Agt*..........New Haven, Ct.
John Henney, Jr., *Supt. M. P*...New Haven, Ct.
N. Y. & N. H. Div.: W. H. Stevenson, *Supt*... N. Y.
Shore Line and Air Line Divs.:
W. A. Waterbury, *Supt*.....New Haven, Ct.
Jas. Denver, *M. C. B*..........New Haven, Ct.
Hart. Div.: C. S. Davidson, *Supt*....Hartford, Ct
O. C. Lackey, *M. M*..............Hartford, Ct
Jno. Whitmore, *For. C. Dept*... Hartford, Ct.
N. Y., Ontario & Western Ry. (*See N. Y., W. Sh. & Buf.*)
N. Y., Pittsb'h & Chicago. 4-8½ g. 20 m. 2 lo. 32 c.
Geo. W. Dixon, *Supt*..........New Galilee, Pa.
H. T. Hanna, *Pur. Agt*.........Pittsburgh, Pa.
N. Y., Pennsylvania & Ohio R. R. (*See N. Y., L. E. & W.*)
New York, Philadelphia & Norfolk R. R.
4-8½ g. 10 m. 1 lo. 4 cars.
H. W. Dunne, *Supt*..........Cape Charles, Va.
New York, Providence & Boston R. R.
4-8½ g. 83 m. 29 lo. 430 cars.
J. B. Gardner, *Supt*..........Providence, R. I.
J. L. Hayden, *Pur. Agt*......Stonington, Conn.
Geo. H. Griggs *M. M. & C. B*..Providence, R. I.
N. Y., Susqueh'na & W'n. 4-9 g. 147 m. 33 lo. 1,469 c.
F. A. Potts, *Gen. Man*.........New York, N. Y.
C. D. McKelvey, *Supt*.........Jersey City, N. J.
C. T. Demarest, *Pur. Agt*.....New York, N. Y.
W. C. Ennis, *M. M. & C. B*...Wortendyke, N. J.
New York, Texas & Mexican Ry.
4-8½ g. 92 m. 6 lo. 95 cars.
M. D. Monserate, *Gen. Man*....Victoria, Tex.
J. G. Conlon, *M. M*................Victoria, Tex
New York, West Shore & Buffalo.
4-8½ g. 850 m. 177 lo. 7,291 c.
J. D. Layng, *Gen. Man*........New York, N. Y.
C. W. Bradley, *Gen. Supt*.....Weehawken, N. J.
P. S. Bemis, *Pur. Agt*.........New York, N. Y.
R. H. Soule, *Supt. M. P*.......Frankfort, N. Y.
H. R. Div.: J. P. Bradfield, *Act. Supt.*, Weehawken, N. J
Thos. Oldcorn, *M. M*....New Durham, N. J.
Buff. Div.: D. B. McCoy, *Supt*....Newark, N. Y.
N. Falls Div.: W. J. Murphy, *Supt*.. Buffalo, N. Y.
Coeymans to Newark.
Jas. M. Boon, *M. M*...........Frankfort, N. Y.
Newark to Buffalo.
Geo. W. West, *M. M*....... East Buffalo, N. Y
New York, Ontario & Western.
J. E. Childs, *Gen. Supt*.........New York, N. Y.
N. Y. Woodhaven & Rockaway R. R. (*See Long Is.*)
N. Y. & Greenwood Lake Ry. (*See N. Y., L. E. & W.*)
N. Y. & Manhattan Beach Ry. (*See Long Island.*)
New York & Long Branch R. R. (*See Phil. & Read.*)
New York & New England R. R.
4-8½ g. 473 m. 145 lo. 3,959 cars.
W. H. Turner, *Gen. Supt*....... Boston, Mass.
W. W. McKim, *Pur. Agt*........Boston, Mass.
J. B. Henney, *Supt. M. P*.......Boston, Mass.
W. H. Griggs, *M. M*..........Norwood, Mass.
Elias E. Pratt, *M. C. B*..........Norwood, Mass.
East Div: E. G. Allen, *Supt*........Boston, Mass.
Nor. Div.: P. St. M. Andrews, *Supt*...Norwich, Ct.
S. F. Whaley, *M. M*...............Norwich, Ct.
Prov. Div.: L. W. Palmer, *Supt*..Providence, R. I.
Hfd. Div.: E. Holbrook, *Supt*.......Hartford, Ct.
E. M. Humstone, *M. M*..........Hartford, Ct.
West'n Div.: C. H. Platt, *Supt*.....Fishkill, N. Y.
Woons'kt Div.:
E. N. Tucker, *Supt*..........Needham, Mass.
New York & Sea Beach R. R. 4-8½ g. 6 m. 6 lo. 41 c.
W. O. McDowell, *Gen. Man*... New York, N. Y.
C. W. Douglass, *Gen. Supt*...Bay Ridge, N. Y.
Newark, Somerset & Straitsville R. R. (*See B. & O.*)
Newburg, Dutchess & Conn. R. R. 4-8½ g. 59 miles.
C. L. Kimball, *Gen. Supt*.....Matteawan, N. Y
W. G. Van Buskirk, *M. M. & C. B.*, Dutchess Junction, N. Y.
Newfoundland Ry. 3-6 g. 45 m. 7 lo. 41 c.
C. X. Hobbs, *Gen. Man*........St. John's, N'f'd.

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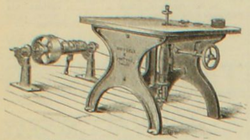
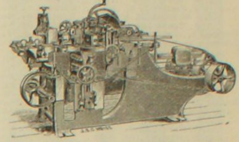
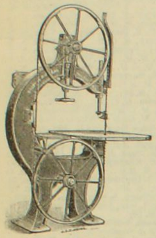
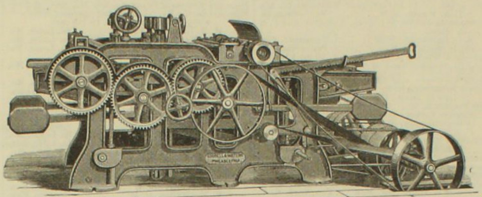
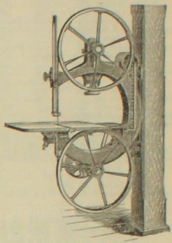
PLANING MILLS,
CAR SHOPS,
RAILWAY SHOPS,
BRIDGE BUILDERS,
Etc., Etc.

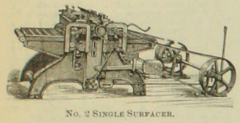

SINGLE SPINDLE UPRIGHT SHAPER.

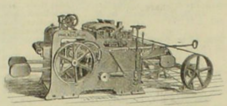

SEVEN-INCH FOUR-SIDED MOLDER.

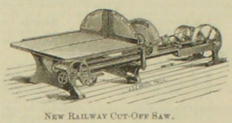

35-INCH BAND SAW.

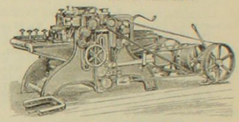

CAR SILL PLANER AND DOUBLE-SURFACER AND JOINTER.


BRACKET BAND SAW.


No. 2 SINGLE SURFACER.


"THE PHILADELPHIA" ENDLESS BED D. S.


NEW RAILWAY CUT-OFF SAW.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SAVES OIL AND REPAIRS, PREVENTS DELAY TO TRAINS, AND NEVER CUTS THE JOURNALS.
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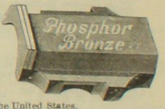

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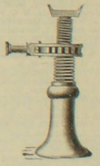

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Norfolk Southern R. R. 4-8½ g. 74 m. 7 lo. 182 c.
M. K. King, *Gen. Man. & Pur. Agt.* Norfolk, Va.
J. S. Whitworth, *M. M. & C. B* ....Norfolk, Va.
Norfolk & Ocean View R. R. & Hotel Co.
3 g. 8 m. 2 lo. 9 cars.
W. H. Taylor, *Pres* ....Norfolk, Va.
Norfolk & Va. Beach R. R. 3 g. 18 m.
J. M. Dickey, *Gen. Man*..........Norfolk, Va
Norfolk & Western R. R. 5 g. 486 m. 82 lo. 1,779 c.
Jos. H. Sands, *Gen. Supt*.........Roanoke, Va
S. B. Hauot, *Supt. M. Power*.... Roanoke, Va.
East Div.: N. M. Osborne, *Supt*.....Norfolk, Va.
West Div.: Frank Huger, *Supt*..Lynchburg, Va
North-Eastern R. R. of Ga. 5 g. 72 m. 2 lo. 20 cars.
H. R. Bernard, *Supt*..................Athens, Ga
North-Eastern R. R. (S. C.) *(See Wil. & Wel.)*
North Pacific Coast R. R. 3 g. 84 m. 12 lo. 320 cars.
Gen. Supt..........San Rafael, Cal.
W. F. Russell, *Pur. Agt* ....San Francisco, Cal.
E. L. Reese, *M. M*...............Saucelito, Cal.
North Shore Ry. *(See Canadian Pacific.)*
Northern (N. H.), and Concord & Claremont Rys.
(See Boston & Lowell.)
Northern (N. J.) R. R. *(See N. Y., L. E. & W'n.)*
Northern Central Ry. *(See Penna. R. R. (6) Div.)*
North'n Pacific R. R. 4-8½ g. 2,646 m. 391 lo. 9,897 c.
T. F. Oakes, *Gen. Man*..........St. Paul, Minn.
John H. Ames, *Gen. Pur. Agt*..St. Paul, Minn.
Geo. W. Cushing, *Supt. M. P., M. & R. S.* do.
J. C. Barber, *M. C. B*..........Brainerd, Minn.
(1) E'n Div.: J. T. Odell, *A. Gen. Man.* St. Paul, Minn.
1st Gr. Div.: M. C. Kimberly, *Supt.* Brainerd, Minn.
H. J. Small, *M. M*.............Brainerd, Minn.
M. C. B......Brainerd, Minn.
2d Gr. Div.: J. M. Graham, *Supt.* Jamestown, Dak.
C. C. Quinn, *M. M*.................Fargo, Dak.
A. Bardsley, *M. M*..............Mandan, Dak.
F. Greene, *A. Supt*..............Mandan, Dak.
3d Gr. Div.: S. R. Ainslie, *Supt*.. Glendive, Mont.
S. L. Bean, *M. M*..............Glendive, Mont.
C. W. Rossiter, *M. M*.......Livingston, Mont.
(2) W'n Div.: J. M. Buckley, *Asst. Gen. Man.*
New Tacoma, W. T.
W. T. Small, *A. S. Mach*.......Tacoma, W. T.
4th Gr. Div.: F. W. Gilbert, *Supt.* Missoula, Mont.
F. P. Weymouth, *Supt*........Sprague, W. T.
Wm. Garlock, *M. M*.........Missoula, Mont.
J. Evans, *M. M*................Sprague, W. T.
5th Gr. Div.: Otis Sprague, *Supt*...Tacoma, W. T.
Northern & North-W'n Rys. 4-8½ g. 378 m. 50 lo. 1,195 c.
James Webster, *Supt*..............Toronto, Can.
W. C. Schreber, *Pur. Agt*.......Allandale, Can.
P. Clarke, *M. M*.....................Toronto, Can.
Northern & Western Ry. 4-8½ g. 50 m.
J. B. Snowbail, *Man*...............Chatham, N. B.
Nova Scotia Ry. 4-8½ g. 79 m. 9 lo. 268 c.
C. A. Scott, *Gen. Man*......New Glasgow, N. S.
M. F. Punch, *M. M*........New Glasgow, N. S.

O

Ogdensburg & Lake Champlain R. R.
4-8½ g. 130 m. 33 lo. 1,694 cars.
A. A. Gaddis, *Gen. Man*......Ogdensburg, N. Y.
E. B. Burnham, *Pur. Agt*...Ogdensburg, N. Y.
Wm. A. Short, *M. M*...............Malone, N. Y.
H. S. Leach, *Master Builder.* Ogdensburg, N. Y.
Ohio River R. R. 4-9 g. 9 lo. 350 cars.
C. L. Williams, *Asst. Supt.* Parkersburg, W. Va.
S. Litchworth, *M. M.*......Parkersburg, W. Va.
Ohio Southern R. R.:
W. H. Van Tassel, *Supt*........Springfield, O.
John King, *M. M*..................Springfield, O.
Ohio & Mississippi Ry. 4-9 g. 616 m. 113 lo. 2,501 cars.
W. W. Peabody, *Pres. & Gen. Man.* Cincinnati, O.
G. E. Atwood, *Pur. Agt*..........Cincinnati, O.
F. W. Stapf, *Gen. M. M*........Vincennes, Ind.
Cin. Div.: C. B. Cole, *Supt*..........Seymour, Ind.
J. P. Coulter, *Gen. M. C. B*.......Aurora, Ind.
E. E. Jenks, *A. Gen. For*......Seymour, Ind.
W. L. Hoffecker, *Ass't M. M.* Vincennes, Ind.
A. N. Bradley, *M. C. P*.........Cochran, Ind.
St. L. & Sp. Div.: C. M. Stanton, *Supt.* St. Louis, Mo.
J. W. Stokes, *M. M.* (Spring. Div.)..Pana, Ill.
Louisv. Div.: C. B. Cole, *Supt*.....Louisville, Ky.
Old Colony R. R. 4-8½ g. 470 m. 124 lo. 3,327 cars.
J. R. Kendrick, *Gen. Man*..........Boston, Mass.
R. W. Husted, *Pur. Agt*.............Boston, Mass.
Jas. N. Lauder, *Supt. R. S*.......Boston, Mass.
Sam. Stevens, *S. Br. & Bld'gs*....Boston, Mass.
Main Li. Div.: J. H. French, *Supt*...Boston, Mass.
F. M. Twombly, *M. M*...............Boston, Mass.
Cape Cod Div.: C. H. Nye, *Supt*..Hyannis, Mass.
F. M. Twombly, *M. M*...............Boston, Mass.
No. Div.: I. N. Marshall, *Supt*...Fitchburg, Mass.
A. W. Twombly, *M. M*..........Taunton, Mass.
Olympia & Chehalis Val. R. R. 3 g. 15 m.
Otis Sprague, *Supt*...............Olympia, W. T.
Oregon Ry. & Navigation Co.
3 & 4-8½ g. 807 m. 72 lo. 1,611 cars.
C. H. Prescott, *V. P. & Gen. Man.* Portland, Ore.
F. T. Dodge, *Supt.* (Riv. Div.)....Portland, Ore.
H. S. Rowe, *Supt.* (Ry Div.).......Portland, Ore.
J. M. Drake, *Pur. Agt*............Portland, Ore.
Goodall, Perkins & Co., *Supt.* (Ocean Div.)
San Francisco, Cal.
C. C. Hobart, *Gen. M. M*.......The Dalles, Ore.
P. Carlsen, *Foreman*...........The Dalles, Ore.
Oregon & California R. R. 4-8½ g. 449 m. 43 lo. 626 c.
R. Koehler, *Man*..................Portland, Ore.
J. Brandt, *Gen. Supt*.............Portland, Ore.
W. T. Bodley, *Pur. Agt*..........Portland, Ore.
A. Brandt, *M. M*...................Portland, Ore.
Ottumwa & Kirkville Ry. 4-8½ g. 13 m.
J. A. Kebler, *Supt*...............Ottumwa, Ia.
Owensboro & Nashville R. R. 5 g. 44 m. 3 lo. 70 c.
W. M. Newbold, *Supt*...........Owensboro, Ky.
J. T. Edwards, *M. M. & C. B*..Owensboro, Ky.
Oxford & Henderson R. R. 4-8½ g. 13 m. 2 lo. 11 c.
James A. White, *Gen. Supt*...Henderson, N. C.
James E. Lawrence, *M. M*....Henderson, N. C.

P

Pacific Coast Ry. 3 g. 64 m.
J. M. Fillmore, *Manager* San Luis Obispo, Cal.
John Walch, *M. M. & C. B.* do.
Painesville & Youngstown Ry. 3 g. 65 m. 7 lo. 319 c.
R. K. Paige, *Rec. & Man*.........Painesville, O.
J. A. Newcome, *Supt. R. S*.......Painesville, O.
Panama R. R. 5 g. 48 m. 14 lo. 2,200 cars.
G. A. Burt, *Gen. Supt*..... Aspinwall, U. S. Col.
E. Z. Penfield, *Pur. Agt*.......New York, N. Y.
Jos. Beaumont, *M. M*.....Aspinwall, U. S. Col.
Passumpsic R. R. 4-8½ g. 147 m. 28 lo. 1,101 cars.
E. Raymond, *Pres. & Pur. Agt.* Boston, Mass.
H. E. Folsom, *Supt*.............Lyndonville, Vt.
L. L. Brigham, *M. M*..........Lyndonville, Vt.
L. F. Woodard, *M. C. B*.......Lyndonville, Vt.
Paw Paw and Toledo & South Haven R. Rds.
3 g. 20 m. 3 lo. 16 cars.
John Ihling, *Supt*..................Lawton, Mich.
Peach Bottom R. R. 3 g. 55 m. 6 lo. 52 cars.
B. B. Newton, *Supt. & Pur. Agt*...Oxford, Pa.
E. H. Williams, *M. C. B*..................York, Pa.
W. P. Kirk, *M. M*........................Oxford, Pa.
Pemigewasset Valley R. R. 4-8½ g. 21 m. 2 lo. 127c.
J. Thomas Vose, *Pres*........ Boston, Mass.
Pennsylvania Co.'s (5) Roads
4-9 g. 3,222 m. 920 lo. 32,809 cars.
Gen. Divs. (1), (2), (3), (4) and (5).
James McCrea, *Gen. Man*.... Pittsburgh, Pa.
Wm. A. Baldwin, *Manager*.... Pittsburgh, Pa.
Wm. Mullins, *Gen. Pur. Agt*....Pittsburgh, Pa.
Joseph Wood, *Supt. M. P*.......Fort Wayne, Ind.
(1) Pittsburgh, Ft. Wayne & Chicago Ry.
4-9 g. 468 m. 288 lo. 8,023 cars.
E'n Div.: A. B. Starr, *Supt*.......Allegheny, Pa.
Geo. J. Parkin, *M. M*...........Allegheny, Pa.
D. M. Peppard, *M. M*..........Crestline, O.
W'n Div.: C. D. Law, *Supt*.....Ft. Wayne, Ind.
F. D. Casanave, *M. M*........Ft. Wayne, Ind.
A. H. Somers, *Gen. For. Shops*...Chicago, Ill.
(2) Ashtabula & Pittsburgh, and
(3) Erie & Pittsburg R. Rds. 221 m. 29 lo. 1,362 c.
John M. Kimball, *Supt*..Lawrence Junc., Pa.
J. A. Wood, *Gen. For. Shops*........Erie, Pa.
(4) Cleveland & Pittsb'g R. R. 225 m. 97 lo. 3,534 c.
R. F. Smith, *Asst. Man*..........Cleveland, O.
John Thomas, *Supt*...............Wellsville, O.
W. F. Beardsley, *Mast. of Mach.* Wellsville, O.
(5) No-W'n Ohio Ry.: J. S. Morris, *Supt*...Toledo, O.
Pennsylvania R. R. Co.'s Roads. (7 Gen. Divs.)
4-9 g. 3,158 m. 1,459 loco. 66,816 cars.
Chas. E. Pugh, *Gen. Man*......Philadelphia, Pa.
Enoch Lewis, *Pur. Agt*.......Philadelphia, Pa.
S. M. Provost, *Supt. Trans*...Philadelphia, Pa.
Theo. N. Ely, *Gen. S. M. P*.........Altoona, Pa.
Pennsylvania R. R. Divs.
4-9 g. 1,213 m. 705 lo. 46,819 cars.
Robt. E. Pettit, *Gen. Supt*........Altoona, Pa.
Frank L. Sheppard, *Supt. M. P*..Altoona, Pa.
G. W. Strattan, *M. M*................Altoona, Pa.
Jno. P. Levan, *Gen. Fore*..........Altoona, Pa.
Phila. Div.: Tho. Gucker, *Supt.* Philadelphia, Pa.
H. D. Garrett, *M. M*....W. Philadelphia, Pa.
I. W. Van Houten, *Gen. For*....W. Phila., Pa.
Schuylkill Div.:
Jas. Reed, *Supt*..........................Reading, Pa.
Mid. Div.: O. E. McClellan, *Supt.* Harrisburg, Pa.
E. L. Caum, *M. M*..............Harrisburg, Pa.
Samuel W. Myers, *Gen. For.* Harrisburg, Pa.
Altoona Div.: J. B. Hutchinson, *Supt.* Altoona, Pa.
Pitts. Div.: Robert Pitcairn, *Supt*..Pittsburgh, Pa.
D. O. Shaver, *M. M*...............Pittsburgh, Pa.
J. G. Stewart, *Gen. For*.........Pittsburgh, Pa.
W. Pa. Div.: A. P. Kirtland, *Supt.* Blairsville, Pa.
Wm. B. Norris, *M. M*............Blairsville, Pa.
M. H. Fails, *Gen. For*..............Blairsville, Pa.
Fred. Div.: Wilson Brown, *Supt*.........York, Pa.
Tyrone Div.: S. S. Blair, *Supt*.........Tyrone, Pa.
Lew. Div.: Wm. M. Phillips, *Supt.* Lewistown, Pa.
Bed. Div.: R. L. Holliday, *Supt*......Bedford, Pa.
Monong. Div.: David M. Watt, *Supt.* Pittsburgh, Pa.
Wm. Lininger, *M. M*.................Ormsby, Pa.
(2) United R. Rs. of N. J. Divs. 471 m. 330 lo. 4,041 c.
F. Wolcott Jackson, *Gen. St.* Jersey City, N. J.
H. S. Hayward, *Supt. M. P*...Jersey City, N. J.
David H. Baker, *Gen. For*...Jersey City, N. J.
N. Y. Div.: Jos. A. Crawford, *Supt.* Jersey City, N. J.
L. A. Bosdevex, *M. M*........Jersey City, N. J.
E. F. Bosdevex, *Gen. For*..Jersey City, N. J.
Belv. Div.: J. A. Anderson, *Supt.* Lamberty., N. J.
R. McDowell, *M. M*.......Lambertville, N. J.
Amboy Div.: W. N. Bannard, *Supt.* Camden, N. J.
Thos. Kerr, *M. M*..........So. Amboy, N. J.
P. S. Bogart, *Gen. For*......So. Amboy, N. J.
(2½) Camden & At. Rd.: 75 m. 18 l. 261 c.
A. G. Dayton, *Supt*............Camden, N. J.
Rufus Hill, *M. M*................Camden, N. J.
Samuel Wills, *M. C. B*..........Camden, N. J.
(3) West Jersey R. R. 4-9 g. 188 m. 27 lo. 294 cars.
A. G. Dayton, *Gen. Supt*........Camden, N. J.
W. McAlister, *M. M*...............Camden, N. J.
C. C. Williams, *Gen. For*........Camden, N. J.
(4) Phila., Wilm. & Balt. R. R. 409 m. 128 lo. 1,882 c.
H. F. Kenney, *Gen. Supt*.....Philadelphia, Pa.
J. M. Wallis, *S. M. P*..........Philadelphia, Pa.
H. D. Gordon, *M. M*..........Wilmington, Del.
W. H. Lungren, *M. C. B*......Wilmington, Del.
Cen. Div.: L. K. Lodge, *Supt*..........Media, Pa.
Del. Div.: I. N. Mills, *Supt*..........Clayton, Del.
Ma. Div.: H. H. Carter, *Supt*..Wilmington, Del.
(5) Phila. & Erie R. R. Divs.: 437 m. 110 lo. 3,089 c.
R. Neilson, *Gen. Supt*........Williamsport, Pa.
Edw. D. Nelson, *Supt. Mo. Po.* Williamsport, Pa.
E'n. Div.: E. B. Westfall, *Supt.* Williamsport, Pa.
Sun. H. & W. Div: A. Walter, *Supt.*; and
H. K. Stout, *M. M*..................Sunbury, Pa.
Mid. Div.: Tho. A. Roberts, *Supt*.....Renovo, Pa.
Wm. L. Holman, *M. M*............Renovo, Pa.
West'n Div.: J. W. Reynolds, *Supt*.....Erie, Pa.
J. Gaskill, *M. M*.............................Erie, Pa.
(6) Northern Central Ry. 4-9 g. 346 m. 152 lo. 6,610 c.
Robert Neilson, *Gen. Supt*...Williamsport, Pa.
Edw. D. Nelson, *Supt. M. P*..Williamsport, Pa.
A. W. Sumner, *Pur. Agt*..........Baltimore, Md.
J. M. Coale, *M. M*....................Baltimore, Md.
G. W. Demarest, *Gen. For*......Baltimore, Md.
Susq. Div.: E. B. Westfall, *Supt.* Williamsport, Pa.
Sham. Div.: A. Walter, *Supt*...........Sunbury, Pa.
Elm. & Can. Divs.: S. Meade, *Supt*..Elmira, N. Y.
Jas. Strode, *M. M*.......................Elmira, N. Y.
J. C. Dyott, *Gen. For*..................Elmira, N. Y.
Sodus Bay Div.: S. Mead, *Supt.* Sodus Point, N. Y.
Baltimore Div.: H. W. Kapp, *Supt.* Baltimore, Md.
(7) Balt. & Pot. & Alex. & Fred. 125 m. 30 lo. 360 c.
H. F. Kenny, *Gen. Supt*.......Philadelphia, Pa.
A. W. Sumner, *Pur. Agt*..........Baltimore, Md.
J. M. Wallis, *Supt. Mo. Po*....Philadelphia, Pa.
H. D. Gordon, *M. M*............Wilmington, Del.
J. Lescallett, *For. Mach. Shop.* Washington, D. C.
R. F. Downs, *For. Car Shop*..Washington, D. C.
Penn. Coal Co.'s R. R. 4-3 g. 67 m. 23 eng. 3,271 c.
J. B. Smith, *Gen. Supt*..........Dunmore, Pa.
And. Crane, *M. M*...................Dunmore, Pa.
Geo. W. Simpson, *M. C. B*........Dunmore, Pa.
Pennsylvania, Slatington & New England R. R.
In progress. 4-8½ g. 18 m. 1 lo. 20 cars.
C. H. Stanton, *Supt*............New York, N. Y.
Pennsylvania & Erie R. R.—Early Branch.
C. R. Early, *Gen. Supt*.............Ridgeway, Pa.
Pensacola & Atlantic R. R. 5 g. 161 m. 9 lo. 67 cars.
E. O. Saltmarsh, *Gen. Supt*.... Pensacola, Fla.
W. D. Robb, *M. M*..................Pensacola, Fla.
Pensacola & Perdido R. R. 5 g. 10 m. 5 lo. 92 cars.
B. F. Simmons, *Pr. & Supt*.... Pensacola, Fla.
H. W. Simmons, *Pur. Agt*......Pensacola, Fla.
J. C. Schutte, *M. M*..............Pensacola, Fla.
People's Ry. 4-8½ g. 15 m. 2 lo. 14 cars.
W. D. Pollard, *Supt*..............Pottsville, Pa.
Peoria, Decatur & Evansville Ry.
4-8½ g. 254 m. 30 lo. 1,660 cars.
G. L. Bradbury, *Gen. Man*........ Peoria, Ill.
P. Reilly, *M. M*........................Mattoon, Ill.
Peoria & Farmington R. R. *(See Cen. Ia.)*
Peoria & Pekin Union Ry. 4-8½ g. 20 m. 12 lo. 106 c.
Thos. B. Burnett, *Gen. Supt. & P. A.* Peoria, Ill.
O. W. Bell, *Supt*.............................Peoria, Ill.
R. F. Hurd, *M. M. & C. B*..............Peoria, Ill.
Perkiomen R. R. 4-8½ gauge 39 miles.
D. B. Clack, *Supt*......Perkiomen Junction, Pa.
H. Boyd, *Pur. Agt*..................Norristown, Pa.
Petersburg R. R. 4-8½ g. 64 m. 10 lo. 133 cars.
R. M. Sully, *Supt*..................Petersburg, Va.
Geo. F. Jones, *Pur. Agt*.........Petersburg, Va.
J. R. Woodard, *M. M*..............Petersburg, Va.
Phila., Wilmington & Balt. R. R. *(See Penna. R. R.)*
Peterborough & Hillsborough. *(See Northern, N. H.)*
Philadelphia, Newtown & N. Y. R. R. 4-8½ g. 23 m.
W. M. Geary, *Supt*...............Philadelphia, Pa.
Phila. & Atlantic City R. R. 4-8½ g. 54 m.
John E. Wootten, *Gen. Man.* Philadelphia, Pa.
W. Bertolet, *Supt*..................Philadelphia, Pa.
W. S. Wilson, *Pur. Agt*.........Philadelphia, Pa.
Philadelphia & Erie R. R. *(See Penna. R. R.; (5) Div.)*
Philadelphia & Reading R. R.
4-8½ g. 1,588 m. 940 lo. 57,477 cars.
John E. Wootten, *Gen. Man*..Philadelphia, Pa.
W. S. Wilson, *Pur. Agt*......Philadelphia, Pa.
Geo. Eltz, *Supt. Trans*............... Reading, Pa.
L. B. Paxson, *Eng. of Mach*......... Reading, Pa.
No. Penn. & Bound Brook Div.:
I. A. Sweigard, *Supt*..........Philadelphia, Pa.
Mahanoy & Susquehanna Div.:
J. H. Olhausen, *Supt*..............Palo Alto, Pa.
D. C. Reinhart, *Asst. Supt*....Catawissa, Pa.
A. A. Hesser, *Asst. Supt* Mahanoy Plane, Pa.
Schuylkill & Susquehanna Br.:
H. W. Tracy, *Supt*..................Pine Grove, Pa.
Reading & Columbia R. R.:
A. M. Wilson, *Supt*...................Columbia, Pa.
N. J. Central and N. J. Southern Divs.:
W. W. Stearns, *Supt*.............. Elizabeth, N. J.
Lehigh & Susquehanna Div.:
G. W. Twining, *Supt*......... Mauch Chunk, Pa.
Pittsburgh, Bradford & Buffalo Ry. *(See Pitts. & West.)*
Pittsburgh, Chartiers & Youghiogheny R. R.
4-8¾ g. 19 m.
Geo. S. Griscom, *Gen. Man*.....Pittsburgh, Pa.
Pittsburgh, Cincinnati & St. Louis Ry (5 Gen. Divs.)
4-9 g. 918 m. 239 lo. 7,133 cars.
James McCrea, *Gen. Man*.......Pittsburgh, Pa.
John F. Miller, *Gen. Supt*......... Columbus, O.
Wm. Mullins, *Pur. Agt*...........Pittsburgh, Pa.
Edward B. Wall, *Supt M. P*.......Columbus, O.
Robt. Curtis, *M. M*.....................Columbus, O.
(1) P., C. & St. L. Div.: E. B. Taylor, *Supt.* Pittsburgh, Pa.
C. B. Street, *M. M.*................Dennison, O.
J. M. Copeland, *G. F. Car Shops.* Steubenville, O.
(2) C. & M. V. Div.: W. F. Black, *Supt*..Zanesville, O.
Leroy Kells, *M. M*...................Lancaster, O.
Wm. Meikle, *Gen. For*...............Lancaster, O.
Daniel Jewell, *Gen. F. Car Shops.* Lancaster, O.
(3) Li. Mi. Div.: Ralph Peters, *Supt*....Cincinnati, O.
Leroy Kells, *M. M*.....................Cincinnati, O.
Jos. Underwood, *G. F. Car Shops.* Cincinnati, O.
(4) J. M. & I. R. R.: W. F. Black, *Supt*.. Louisville, Ky.
Wm. Swanston, *M. M*......Indianapolis, Ind.
Edw. Austin, *G. F. C. Shops*..Indianapolis, Ind.
(5) Indianapolis & Vincennes R. R.
M. W. Mansfield, *Supt*.... Indianapolis, Ind.
Pittsburgh, Cleveland & Toledo R. R.
4-8¾ g. 78 m. 18 lo. 525 cars.
C. H. Andrews, *Pres*............Youngstown, O.
W. F. Hofecker, *M. M*..........Youngstown, O.
Pittsburgh, Ft. Wayne & Chicago Ry. *(See Penna. Co.)*
Pittsburgh Southern Ry. *(See Balt. & O.)*
Pitts. & Castle Shannon R. R. 3 4 g. 9 m. 5 lo. 428 c.
Gen. Supt... Pittsburgh, Pa.
Holmes Ward, *M. M*......Castle Shannon, Pa.
Wm. E. Long, *M. C. B*.............Pittsburgh, Pa.
Pitts. & Lake Erie R. R. 4-8¾ g. 70 m. 30 lo. 1,528 c.
W. C. Quincy, *Gen. Man*..........Pittsburgh, Pa.
D. H. Hostetter, *Pur. Agt*........Pittsburgh, Pa.
R. W. Jones, *Mast. Trans*.......Pittsburgh, Pa.
S. W. Haines, *M. M*..................Pittsburgh, Pa.
Pittsburgh, McKeesport & Youghiogheny.
4-8¾ g. 57 m. 19 lo. 278 cars.
W. C. Quincy, *Gen. Man*........Pittsburgh, Pa.
R. W. Jones, *M. of Trans*......Pittsburgh, Pa.
S. W. Haines, *M. M*.................Pittsburgh, Pa.
Pitts. & Western R. R. 3 & 4-8½ g. 274 m. 50 lo. 1,407 c.
Pitts., Bradford & Buff. Ry. 3 g. 93 m. 8 lo. 163 c.
Tho. M. King, *Gen. Man*..........Allegheny, Pa.
J. T. Johnson, *Supt*..................Allegheny, Pa.
J. Morton Hall, *Pur. Agt*.........Allegheny, Pa.
W. M. Flahavhan, *M. M*...........Allegheny, Pa.
Pontiac, Oxford & Pt. Austin R. R. 100 m.
Geo. W. Debevoise, *Pr. & Gen. Man.* N. York, N. Y.
Jas. Houston, *Gen. Supt*..........Pontiac, Mich.
Port Huron & No.-Western Ry. 3 g. 218 m. 14 lo. 288 c.
H. McMorran, *G. Man. & P. A.* Port Huron, Mich.
I. R. Wadsworth, *Supt*.......Port Huron, Mich.
Chas. Diefenbach, *M. M*......Port Huron, Mich.
Benj. Hillier, *M. C. B*.........Port Huron, Mich.
Port Jervis & Monticello R. R. 4-8½ g. 24 m. 3 lo. 13 c.
J. M. Warner, *Gen. Man*.....Port Jervis, N. Y.
Port Royal & Augusta, 5 g. 180 m. 16 lo. 310c
and Augusta & Knoxville Rys.
J. N. Bass, *Supt*............................Augusta, Ga.
T. F. Warwick, *M. M. & M. C. B.* Augusta, Ga.
Portland & Ogdensburg. 4-8½ g. 110 m. 11 lo. 311 c.
J. Hamilton, *Gen. Supt. & P. A*..Portland, Me.
M. M......................Portland, Me.
W. G. Brewer, *M. C. B*.................Portland, Me.
Portland & Rochester R. R. 4-8½ g. 52 m. 8 lo. 226 c.
J. W. Peters, *Supt. & Pur. Agt*...Portland, Me.
E. H. C. Tompson, *For. of Mach*..Portland, Me.
David Dow, *For. of Car Repairs.* Portland, Me.
Potomac, Fred.'g & Pied. R. R. 3 g. 38 m. 2 lo. 38 c.
W. H. Richards, *Gen. Man.* Fredericksburg, Va.
W. J. Sweigard, *M. M*....Fredericksburg, Va.
Pough., Hart. & Bos. R. R. 4-8½ g. 45 m. 4 lo. 65 c.
J. A. Perkins, *Supt*........Poughkeepsie, N. Y.
John L. Donaldson, *M. M.* Poughkeepsie, N. Y.
Pratt Coal & Iron Company's R. R. 5 g. 20 m. 4 lo. 184 c.
W. L. Gude, *Gen. Man*........Pratt Mines, Ala.
Prescott & Thirty-Fifth Parallel R. R.
4-8½ g. 77 miles in progress.
Samuel A. Henszey, *Gen. Man*..Prescott, Ariz.
Prince Edward Island Ry. 3-6 g. 220 m. 21 lo. 350 c.
Jas. Coleman, *Supt. & Pur. Agt.*;
Jos. Unsworth, *M. Supt. & Storekeeper*; and
D. M. Fraser, *M. C. B*..Charlottetown, P. E. I.
Profile & Franconia Notch R. R. 3 g. 15 m. 3 lo. 18 c.
Emmons Raymond, *Pur. Agt*.... Boston, Mass.
C. H. Greenleaf, *Supt*......Profile House, N. H.
Prospect Park & Coney Island R. R.
4-8½ g. 15 m. 8 lo. 123 cars.
And. R. Culver, *Pres*..............Brooklyn, N. Y.
R. Schermerhorn, *Supt*.........Brooklyn, N. Y.
Martin Painter, *M. M*...........Brooklyn, N. Y.
Prov., Warren & Bristol R. R. 4-8½ g. 19 m. 6 lo. 79 c.
Waterman Stone, *Supt*.........Providence, R. I.
Rufus Smith, *M. M. & C. B*............Bristol, R. I.
Prov. & Springfield R. R. 4-8½ g. 23 m. 4 lo. 92 c.
Wm. Tinkham, *Gen. Man*.....Providence, R. I.
G. T. Richardson, *M. M*.........Providence, R. I.
Prov. & Worcester. 4-8½ g. 50 m. 37 lo. 1,253 c.
W. E. Chamberlain, *Supt*......Providence, R. I.
A. Griggs, *Supt. L. & C. D*....Providence, R. I.
Pullman's Palace Car Co. 1,100 passenger cars.
Geo. M. Pullman, *Pres*................Chicago, Ill.
H. Porter, *V. Pres*.................New York, N. Y.
Geo. F. Brown, *Gen. Man*............Chicago, Ill.
Wm. A. Angell, *Pur. Agt*..............Chicago, Ill.
S. W. Bretzfield, *Asst. Pur. Agt.* New York, N. Y.
A. Rapp, *Man.* (Chicago Works)...Chicago, Ill.
H. L. Spaulding, *Man.* (Det. Shops). Detroit, Mich.
E. A. Benson, *Supt. Shops*.......... St. Louis, Mo.

Q

Quebec Central Ry. 4-8½ g. 156 m. 10 lo. 267 cars.
J. R. Woodward, *Gen. Man*..Sherbrooke, P. Q.
A. Steele, *Supt*......................Sherbrooke, Que.
R. D. Morkill, Jr., *Pur. Agt*..Sherbrooke, P. Q.
Jas. Seiveright, *M. M*.......... Sherbrooke, P. Q.
Quebec, Montreal, Ottawa & Occidental Ry.
4-8½ g. 354 m. 36 lo. 993 cars.
L. A. Senecal, *Gen. Supt*........Quebec, Can.
Quebec & Lake St. John Ry. 4-8½ g. 36 m. 3 lo. 55 c.
J. G. Scott, *Manager*.................Quebec, Can.
Frank Fournier, *Supt*.......St. Raymond, P. Q.
John T. Eames, *M. M*.......St. Raymond, P. Q.

R

Raleigh & Augusta Air-Line: Carolina Central Raleigh & Gaston R. Rs. 4-8½ g. 446 m. 52 lo. 1,052 c.
John C. Winder, *Gen. Man. & P. A.* Raleigh, N. C.
Raleigh Rds. 4-8½ g. 200 m. 27 lo. 638 cars.
B. R. Harding, *Supt. of Mach.* Raleigh, N. C.
Carolina Cen. R. R. 4-8½ g. 242 m. 26 lo. 431 c.
L. C. Jones, *Supt*...............Wilmington, N. C.
James Maglenn, *M. of Mach.* Laurinburg, N. C.
S. R. Ethridge, *M. C. B*.....Laurinburg, N. C.
Rhinebeck & Connecticut. *(See Hart. & Ct. W'n.)*
Richmond, Fredericksburg & Potomac R. R.
4-9 g. 81 m. 15 lo. 149 cars.
E. T. D. Myers, *Gen. Supt*.......Richmond, Va.
T. L. Courtney, *Asst. Supt*........Richmond, Va.
H. Kuhn, *M. M*..........................Richmond, Va.
W. H. Trainham, *M. C. B*..........Richmond, Va.
Rich., York River & Ches. R. R. *(See Rich. & Dan.)*
Richmond & Alleghany R. R. 4-9 g. 261 m. 19 lo. 837c.
Decatur Axtell, *Rec. & Gen. Man.* Richmond, Va.
M. Sweeney, *Pur. Agt*................Richmond, Va.
Geo. D. Harris, *M. M. & C. B*....Richmond, Va.
Richmond & Danville R. R. Co.'s Roads.
1,736 miles 218 loco. 3,833 cars.
E. B. Thomas, *2d V. P. & G. Man.* Richmond, Va.
Peyton Randolph, *As. G. Man*..Richmond, Va.
J. P. Minetree, *Pur. Agt*........ Richmond, Va.
R. D. Wade, *Supt. Mo. Po*.........Richmond, Va.
(1) Rich. & Dan. R. R. 5 g. 847 m. 131 lo. 2,687 cars.
Rich. & Dan. Div.: 5 g. 320 m. 80 lo. 1,797 c.
Wm. H. Green, *Supt*...............Richmond, Va.
M. M.......Richmond, Va.
J. B. Vaughan, *For. Car Sh*...Richmond, Va.
North Carolina Div. 5 g. 223 m. 22 lo. 268 cars.
A. B. Andrews, *Supt*................Raleigh, N. C.
W. H. Turrentine, *M. M.* Comp'y's Shops, N. C.
J. C. Holt, *For. Car Sh.* Comp'y's Shop, N. C.
Atlanta & Char. Air Line. 5 g. 280m. 31 lo. 415 c.
Narrow-Gauge Branches. 3 g. 80 m. 5 lo. 41 c.
Edmund Berkley, *Supt*................Atlanta, Ga.
T. W. Gentry, *M. M*....................Atlanta, Ga.
Z. T. Smith, *For. Car Sh*............Atlanta, Ga.
(2) Charlotte, Col. & Aug. R. R. 5g. 239 m. 22 lo. 287 c.
G. R. Talcott, *Supt*..................Columbia, S. C.
J. H. Green, *M. M.* (2 roads)...Columbia, S. C.
(3) Columbia & Greenville R. R. 5 g. 297 m. 22 l. 224 c.
G. S. Talcott, *Supt*...................Columbia, S. C.
J. O. Meredith, *For. E. & C. Rep.* do.
(4) Virginia Midland Ry. 4-8½ g. 353 m. 41 lo. 631 c.
Supt. Alexandria, Va.
H. M. Smith, *M. of M*.........Alexandria, Va.
J. T. Nalls, *M. C. B*..........Alexandria, Va.
Richmond & Petersburg R. R. 4-8½ g. 25 m. 8 lo. 132 c.
J. R. Kenly, *Supt*.......................Richmond, Va.
John O'Brien, *M. M*................Richmond, Va.
Rio Grande R. R. 3-6 g. 22 m. 3 lo. 40 cars.
M. J. Gomila, *Rec. & Gen. Man.* Brownsville, Tex.
G. W. Rendall, *M. M*............Brownsville, Tex.
M. Markwood, *M. C. B*..........Brownsville, Tex.
Rio Grande & Pecos Ry. 4-8½ g. 27 m. In progress.
W. W. Hungerford, *Man*.............Laredo, Tex.
Rochester & Lake Ontario Ry. 4-8½ g. 6 m. 2 lo. 10 c.
N. B. Ellison, *Man*...............Rochester, N. Y.
Rochester & Pittsb'g. R. R. 4-8½ g. 260 m. 60 lo. 3,296 c.
Geo. E. Merchant, *Gen. Man*...Rochester, N. Y.
J. T. Gardiner, *Gen. Supt*........Buffalo, N. Y.
C. W. Mills, *Supt. M. P*............Rochester, N. Y.
Rock Island & Mercer County R. R., and
Rock I'd & Peoria Ry. 4-8½ g. 113 m. 13 lo. 357 c.
R. R. Cable, *V.-P. & Gen. Supt*.....Chicago, Ill.
R. I. & P. Ry.:
H. B. Sudlow, *Supt. & P. A*....Rock Island, Ill.
Joseph Elder, *M. M*.........................Peoria, Ill.
R. I. & M. C. Rd.: H. B. Sudlow, *Supt.* R'k Island, Ill.
J. H. Parks, *M. M*......................Rock Island, Ill.
Rogersville & Jefferson R. R. 5 g. 16 m. 1 lo. 6 cars.
C. M. Leuty, *Supt*..................Rogersville, Tenn.
Rome (Ga.) R. R. 5 g. 20 m. 2 lo. 17 cars.
Eben Hillyer, *Pres. & Supt*........ Rome, Ga.
O. W. Harbin, *M. M*......................Rome, Ga.
Rome, Watertown & Ogdensburg R. R.
4-8½ g. 418 m. 61 lo. 1,831 cars.
H. M. Britton, *Gen. Man. & P. A.* Oswego, N. Y.
Geo. H. Haselton, *S. M. P. & M.*..Oswego, N. Y.
E'n Div.: J. D. Remington, *A. Supt.* Watertown, N. Y.
W'n Div.: W. H. Chauncey, *A. Supt.* Oswego, N. Y.
Roodhouse & Scottsville Ry. In progress.
Geo. P. Merrill, *Gen. Man*..............Chicago, Ill.
Rumford Falls & Buckfield R. R. 4-8½ g. 29 m. 2 l. 62 c.
L. L. Lincoln, *Supt. & Pur. Agt*...Canton, Me.

S

Sabine & East Texas Ry. *(See Cen. Pac.)*
Sacramento & Placerville R. R. *(See Cen. Pac.)*
Saginaw Bay & Northw'n R. R. 4-8½ g. 31 m. 6 lo. 136 c.
J. Jackson, *Gen. Man*............Pinconning, Mich.
F. T. Lillote, *Act. Pur. Agt*...Pinconning, Mich.
Edward Keeler, *M. M*..........Pinconning, Mich.
Saginaw, Tuscola & Huron R. R.
3 g. 50 m. 5 lo. 85 cars.
M. B. Wilkinson, *Gen. Supt*..E. Saginaw, Mich.
Saginaw Valley & St. Louis R. R. 4-8½ g. 39 m. 4 l. 64 c
T. M. Fish, *Gen. Supt*....................Ionia, Mich.
N. W. Merrill, *Div. Supt*.........Saginaw, Mich.
Allan Bourn, *Pur. Agt*...............Detroit, Mich.
Geo. C. Watrous, *S. M. P. & R. S.* Ionia, Mich.
Salt Lake & Western R. R. *(See Un. Pac.; (6) Div.)*
San Francisco & No. Pac. 4-8½ g. 139 m. 11 lo. 245 c.
Arthur Hughes, *Gen. Man*..San Francisco, Cal.
H. C. Whiting, *Supt*................San Rafael, Cal.
Ed. Reynolds, *Gen. M. M*.........Donahue, Cal.
Ed. Reynolds, *M. C. B*..............Donahue, Cal.
Sanborn, Cooperstown & Turtle M. R. R. In progress.
C. A. Roberts, *Gen. Man*.......... Sanborn, Dak.
Sandy River R. R. 2 g. 18 m. 3 lo. 36 cars.
N. B. Beal, *Pres. & Supt*.............Phillips, Me.
M. Saunders, *M. M. & C. B*.........Phillips, Me.
Sandusky, Mansfield & Newark R. R. *(See B. & O.)*
Sanford & Indian River R. R. *(See So. Flor.)*
San Luis Obispo & Santa Maria R. R.
3 g. 20 m. 2 lo. 30 cars.
Charles Goodall, *Man*......San Francisco, Cal.
San Pete Valley R. R. 3 g. 33 m. 2 lo. 57 cars.
S. Bamberger, *Man*..... Salt Lake City, U. T.
J. E. Bamberger, *Pur. Agt*.... Salt Lake, U. T.
B. Bates, *M. M*......................... Morvin, U. T.
Saratoga, Mt. McGregor & Lake George R. R.
3 g. 11 m. 3 lo. 12 cars.
John McGee, *Supt*......Saratoga Springs, N. Y.
Savannah, Florida & W'n Ry. 5 g. 519 m. 62 lo. 1,063 c.
H. S. Haines, *Gen. Man*...........Savannah, Ga.
R. G. Fleming, *Supt*.................Savannah, Ga.
A. A. Aveilhé, *Pur. Agt*............Savannah, Ga.
G. M. D. Riley, *M. of Mach*......Savannah, Ga.
E. Geffcken, *For. Car Dept*.....Savannah, Ga.
Sav., Griffin & No. Ala. R. R. *Op. by Central (Ga.)*
Schuylkill & Lehigh R. R. *(See Phil. & Read.)*
Schoharie Valley R. R. *(See Middleburg & Sch.)*
Scioto Valley R. R. 4-8¾ g. 132 m. 19 lo. 548 cars.
Geo. Skinner, *Supt. & P. Agt*.....Columbus, O.
R. Bromley, *M. M*.....................Portsmouth, O.
Seaboard & Roanoke R. R. 4-8½ g. 80 m. 21 lo. 384 c.
L. T. Myers, *Supt*....................Portsmouth, Va.
J. A. Walton, *Pur. Agt*..............Portsmouth, Va.
S. M. P. & M. Portsmouth, Va.
Sedalia, Warsaw & Southern Ry. *(See Mo. Pac.)*
Sharpsville R. R. 4-8½ g. 23 m. 3 lo. 13 cars.
Thos. M. King, *V. P. & Gen. Man.* Pittsburgh, Pa.
W. C. Agnew, *Asst. Gen. Man*..Youngstown, O.
Shelby Iron Co. R. R. {5-9 g. 7 m. 2 lo. / 3-6 g. 12 m. 3 lo.} 50 c.
J. A. McArthur, *G. Man*..Shelby Ir. Wks, Ala.
R. H. Stoughton, *Supt*..Shelby Iron Wks., Ala.
J. H. Burgnardt, *M. M*..Shelby Iron Wks, Ala.
Shell Beach R. R. 5 g. 22 m.
M. R. Spelman, *Supt*.......... New Orleans, La.
Shenandoah Valley R. R. 4-9 g. 249 m. 32 lo. 849 c.
D. W. Flickwir, *Gen. Supt*..........Roanoke, Va.
W. C. De Armond, *Pur. Agt*...Philadelphia, Pa.
Supt. of M. P...Roanoke, Va.
W. A. Morgan, *M. C. B*...........Lynchburg, Va.
J. T. Robinett, *M. M*..............Petersburg, Va.
Shenango & Allegheny R. R. 4-8½ g. 74 m. 8 lo. 248 c.
J. T. Blair, *G. Man. & Pur. Agt.* Greenville, Pa.
Edw. Richardson, *M. M. & C. B.* Greenville, Pa.
Shepaug R. R. 4-8½ g. 38 m. 3 lo. 28 cars.
Edwin McNeill, *Supt*...............Litchfield, Ct.
A. J. Broughet, *M. M*................Litchfield, Ct.
Ship Is., Ripley & Ky. R. R. 3 g. 25 m. 2 lo. 23 cars.
C. L. Harris, *Supt. & Pur. Agt*....Ripley, Miss.
W. H. Phelps, *M. M*.........................Ripley, Miss.
Silver City, Deming & Pacific R. R. 3 g. 47 m. 3 l. 141 c.
John W. Smith, *Gen. Supt*....Silver City, N. M.
Silver Lake Ry. 4-8½ g. 6 m. 1 lo. 4 cars.
C. W. S. Nobles, *Supt*........................Perry, N. Y.
Sinaloa & Durango R. R. 4-8½ g. 39 m. 2 lo. 40 cars.
Geo. S. Skilton, *Gen. S.* Culiacan, Sinaloa, Mex.
John E. Bell, *M. M*.......................Culiacan, Mex.
Skaneateles R. R. 4-8½ g. 5 m. 2 lo. 5 cars.
J. McNamara, *Supt*...............Skaneateles, N. Y.
Sioux City & Pacific R. R. 4-8½ g. 427 m. 31 lo. 893 c.
W. P. Linsley, *Gen. Man*.... Missouri Valley, Ia.
C. M. Lawler, *Gen. Supt*....Missouri Valley, Ia.
R. W. Hamer, *Pur. Agt*...................Chicago, Ill.
W. G. Brownson, *Asst. Supt*.......Norfolk, Neb.
S. A. Teal, *M. M*..................Missouri Valley, Ia.
W. H. Ramseyer, *M. C. B*...Missouri Valley, Ia.
Smyrna & Delaware Bay R. R. *(See Kent County.)*
Sodus Bay Ry. *(See Northern Central.)*
Somerset R. R. 4-8½ g. 25 m. 3 lo. 24 cars.
W. M. Ayer, *Supt. & Pur. Agt*.......Oakland, Me.
S. P. Mosher, *For. Car Rep*.........Oakland, Me.
C. Crowell, *For. Lo. Rep's*...... No. Anson, Me.
Sonora Ry. *(See A., T. & S. Fe.)*
Sonoma Valley:
Arthur Hughes, *Gen. Man.* San Francisco, Cal.
H. C. Whiting, *Supt*..................San Rafael, Cal.
J. T. Peters, *Asst. Supt*..........Glen Ellen, Cal.
Ed. Reynolds, *M. M*......................Donahue, Cal.
South & North Alabama R. R. *(See Louis. & Nash.)*
South Carolina Ry. 5 g. 246 m. 46 lo. 834 cars.
John B. Peck, *Gen. Man*..........Charleston, S. C.
S. B. Pickens, *Pur. Agt*..........Charleston, S. C.
P. J. Cochrane, *Mast. of Mach.* Charleston, S. C.
Geo. H. Gramling, *M. C. B*....Charleston, S. C.
South-Eastern Ry. 4-8½ g. 280 m. 30 lo. 1,000 cars.
T. A. McKinnon, *Gen. Man*.....Montreal, Can.
Robt. McLoud, *M. M*..................Farnham, P. Q.
South Florida R. R. 3 gauge 115 m. 13 lo. 250 cars.
B. R. Swoope, *Supt. & P. A*............Sanford, Fla.
R. Deby, *M. M*..................................Sanford, Fla.
A. B. Allen, *M. C. B*..........................Sanford, Fla.
South Mountain R. R. 4-8½ g. 18 m. 4 lo. 22 c.
W. H. Woodward, *Supt.* Pine G've Furnace, Pa.
South Pacific Coast R. R. 3 g. 81 m. 16 lo. 500 cars.
L. Fillmore, *Gen. Supt*.........San Francisco, Cal.
W. H. Masterman, *M. M. & C. B.* Newark, Cal.
South-Western R. R. (Ga.) *(See Central of Ga.)*
South-Western Ry. (Ky.) 4-8½ g. 5 m. 1 lo. 28 cars.
M. Tabler, *Supt. & Man*.........Harrodsburg, Ky.
J. C. Hool, *Pur. Agt*..............Harrodsburg, Ky.

Southern Central R. R. 4-8½ g. 156 m. 21 lo. 467 c
H. D. Titus, *Gen. Supt. & P.A.*....Auburn, N.Y
John White, *M. M*....Auburn, N. Y
H. Mooney, *M. C. B*....Auburn, N. Y
Southern Kansas Ry. (*See At., Top. & Santa Fe*
Southern Maryland R. R. 4-8½ g. 20 m. 1 lo. 20
J. B. Ridgway, *Supt*....Brandywine, Md.
C. R. Joyce, *M. M*....Brandywine, Md
Southern Pacific R. R. 4-8½ g. 203 m. 335 lo. 780 c
Northern Div. (*For other Divs. see Cen. Pac.*)
A. C. Bassett, *Supt*....San Francisco, Cal.
J. R. Watson, *Pur. Agt*....Sacramento, Cal.
J. T. Wilson, *M. M*....San Francisco, Cal.
F. N. Bellisle, *M. C. B*....San Francisco, Cal.
Southern Pacific R. R. of Arizona. (*See Cen. Pac.*)
Southern Pacific R. R. of New Mexico. (*See Cen. Pac.*)
Spartanburg, Union & Columbia R. R.
(*See Rich. & Dan.; (3) Div.*)
Spring Brook R. R. 4-3 g. 8 m. 1 lo. 18 cars.
Charles Pugh, *Pres*....Pittston, Pa.
Spring Hill & Parrsboro Ry. (*See Cumberland.*)
Springfield, Effingham & So.-E'n Ry. (*See Ind. & Ill.*)
Springville & Sardinia Ry. 4-8½ g. 12 m. 1 lo. 8 c.
Bertrand Chaffee, *Pres*....Springville, N. Y.
St. Croix & Penobscot R. R. 4-8½ g. 22 m. 4 lo. 195 c.
S. W. Haycock, *Supt. & Pur. Agt*..Calais, Me.
G. H. Corsen, *M. M*....Milltown, Me
H. C. Tincker, *M. C. B*....Milltown, Me.
St. Helen, Houghton Lake & West. R. R. 4-8½ g. 13 m.
Z. C. Jessop, *Gen. Man*....Detroit, Mich
St. John & Maine Ry. (*See New Brunswick.*)
St. John's Ry. 4-8½ g. 14½ m. 2 lo. 24 cars.
R. McLaughlin, *Pr. & Supt*..Jacksonville, F'a.
J. M. Owens, *M. of Mach*....St. Augustine, Fla.
St. John's & Lake Eustis Ry. (*See Florida Southern.*)
St. Johnsb'ry & Lake Champ 4-8½ g. 120 m. 15 lo. 372 c.
A. B. Jewett, *Supt. & P. A*..St. Johnsbury, Vt
Geo. E. Howe, *M. M. & C. B.* St. Johnsbury, Vt
St. Joseph Valley R. R. 3 g. 15 m. 1 lo. 11 cars
B. Helmick, *Gen. Man*....Buchanan, Mich
St. Joseph & Des Loge Ry. 3 g. 13 m. 4 lo. 70 cars.
T. T. Onderdonk, *Supt*....Bonne Terre, Mo
E. B. Keyes, *M. C. B*....Bonne Terre, Mo
St. Joseph & Western R. R.
4-8½ g. 252 m. 21 lo. 175 cars.
D. McCool, *Gen. Man*....St. Joseph, Mo.
E. Sleepy, *M. M. & . C. B*....St. Joseph, Mo.
St. Joseph & Des Moines R. R. (*See K. C., St. J. & C. B.*)
St. Lawrence & Ottawa Ry. (*See Can. Pac.*)
St. Louis, Alton & Terre Haute R. R.
Main Line. (*See C., C., C. & I.; Ind. & St. L. Div.*
St. Louis & Cairo Div.: 4-8½ g. 137 m. 19 lo. 800 c
G. W. Parker, *Gen. Man*....E. St. Louis, Ill.
J. L. Hinckley, *Supt*....Belleville, Ill.
P. H. Murphy, *M. M*....E. St. Louis, Ill.
St. Louis Bridge Co. and Tunnel R. R.
4-8½ g. 31 m. 22 lo. 11 cars.
Wm. Taussig, *Gen. Man*....St. Louis, Mo
A. W. Dickinson, *Supt*....St. Louis, Mo.
J. E. Williams, Jr., *Pur. Agt*....St. Louis, Mo
Geo. W. Walshe, *M. M*....St. Louis, Mo.
St. Louis, C. Cœur & St. Ch. Ry. 3 g. 16 m.
F. M. Colburn, *Gen. Man*....St. Louis, Mo.
St. Louis Coal R. R. 4-8½ g. 93 m. 10 lo. 217 cars.
F. L. Hinkley, *Supt*....Carbondale, Ill.
Jas. C. Bryden, *Pur. Agt*....St. Louis, Mo.
St. Louis, Des Moines & Northern Ry. 4-8½ g. 43 m.
C. F. Merk, *Supt*....Des Moines, Ia.
St. L., Ft. Scott & Wichita R. R. 4-8½ g. 214 m. 6 l. 337 c.
J. W. Miller, *V. P. & Gen. Man*..Fort Scott, Kan.
Tho. N. Lewis, *Asst. Supt*....Fort Scott, Kan.
Henry Berger, *M. M*....Ft. Scott, Kan.
St. L., Hannibal & Keokuk. 4-8½ g. 85 m. 5 lo. 70 c.
E. C. Case, *Rec. & Man*....Hannibal, Mo.
W. I. Brokaw, *M. M. & M. C. B.* Hannibal, Mo
St. Louis, Iron Mt. & So'n Ry. (*See Mo. Pac.; (4) Div.*)
St. L., Keokuk & No.-W'n. Ry. (*See C., B. & Q.*)
St. L., Salem & Little Rock. 4-9 g. 72 m. 5 lo. 111 c.
H. A. Crawford, *V. Pr. & P. A*...St. Louis, Mo.
E. B. Sankey, *Supt*....Salem, Mo.
Thomas Everson, *M. M*....Steelville, Mo
J. W. Houston, *M. C. B*....Steelville, Mo.
St. Louis & Cairo R. R. 3 g. 152 m. 22 lo. 896 cars.
Chas. Hamilton, *Gen. Supt*....St. Louis, Mo.
E. J. Newell, *M. M*....E. St. Louis, Mo.
St. L. & San Fran. Ry. 4-8½ g. 943 m. 103 lo. 3,737 c.
C. W. Rogers, *V. P. & Gen. Man*..St. Louis, Mo.
D. H. Nichols, *Supt. Tran*..No. Springfield, Mo.
A. P. Mann, Jr., *Pur. Agt*....St. Louis, Mo.
M. Kearney, *M. M. & C. B*..No. Springfield, Mo.
East Div.: A. Veech, *Supt*....St. Louis, Mo
Central Div.: W. A. Thoms, *Supt*..Springfield, Mo.
Kan. Div.: J. R. Wentworth, *Supt.* Neodesha, Kan.
St. Martin's & Upham Ry. 4-8½ g. 30 m. 2 lo. 8 cars.
A. E. Killam, *Manager*....St. Martin's, N. B.
St. Paul Eastern Grand Trunk Ry. 4-8½ g. 15 m.
D. C. Lamb, *Gen. Supt*....Oconto, Wis.
St. Paul, Minneapolis & Manitoba Ry.
4-8½ g. 1,402 m. 201 lo. 5,068 cars.
A. Manvel, *Gen. Man*....St. Paul, Minn.
H. C. Ives, *Asst. Gen. Man*....St. Paul, Minn.
E. B. Wakeman, *Asst. Gen. Supt.* St. Paul, Minn.
J. C. Morrison, *Pur. Agt*....St. Paul, Minn.
Thos. Downing, *M. M. & C. B*..St. Paul, Minn.
Breck. Div.: W. S. Kemp, *Supt*...St. Paul, Minn.
F. F. Div.: J. B. Rice, *Supt*....St. Paul, Minn.
No'n Div.: A. Guthrie, *Supt*....Crookston, Minn.
St. Paul & Duluth R. R. 4-8½ g. 225 m. 37 lo. 1,080 c.
W. H. Fisher, *Gen. Supt*....St. Paul, Minn.
J. G. Callahan, *Pur. Agt*....St. Paul, Minn.
Chas. F. Ward, *M. M. & M. C. B*..St. Paul, Minn.
State Line & Sullivan R. R. 8½ g. 25 m. 3 lo. 263 c.
I. O. Blight, *Supt*....Towanda, Pa.
Staten Island R. R. ½ g. 13 m. 4 lo. 18 c
J. W. Wilbur, *Supt*....New York, N. Y
Stony Clove & Catskill Mountain R. R.
3 g. 14 m. 2 lo. 22 cars.
Geo. Coykendall, *Gen. Supt*....Rondout, N. Y
Stony Creek R. R. 4-8½ g. 103 m.
Geo. B. Boggs, *Supt*....Norristown, Pa.
Sterling Mountain Ry. 6 g. 8 m. 2 lo. 145 cars.
J. C. Missimer, *Supt*....Sloatsburg, N. Y
Suffolk Lumber R. R. 3 g. 15 m. 3 lo. 41 cars.
W. M. Whaley, *Supt*....Suffolk, Va.
Summit Branch R. R. 4-9 g. 20 m. 7 lo. 10 cars.
Thomas Gucker, *Supt*....Williamstown, Pa.
Susquehanna & Delaware River R. R. In progress.
D. Y. Kilgore, *Pres*....Philadelphia, Pa.
Sussex R. R. (*See Del., Lack. & West.*)
Syracuse, Binghamton & N. Y. R. R. (*See D. L. & W.*)
Syr., Ontario & N. Y. R. R.
Albert Allen, *Supt*....New York, N. Y.
Syracuse, Geneva & Corning
(*See Fall Brook Coal Co.*)

T

Tennessee Coal R. R. 5 g. 28 m. 8 lo. 204 cars.
A. M. Shook, *Gen. Man*....Tracy City, Tenn.
W. A. Knight, *M. M*....Tracy City, Tenn.
Tennessee & Sequatchee Valley R. R.
3 g. 42 m. 1 lo. 24 cars.
Chas. Clinton, *Gen. Supt*....Spring City, Tenn.
P. V. Mooney, *Pur. Agt*....Spring City, Tenn.
Terre Haute & Indianapolis R. R.
4-9 g. 421 m. 105 lo. 4,318 cars.
Joseph Hill, *Gen. Supt*....St. Louis, Mo.
C. R. Peddle, *P. Agt*....Terre Haute, Ind.
Geo. H. Prescott, *S. M. P. & M.* Terre Haute, Ind.
F. C. Cleaver, *M. M*....Terre Haute, Ind
E. D. Carter, *M. C. B*....Terre Haute, Ind.
Chas. Butler, *M. M*....Effingham, Ill.
Clinton Idler, *Foreman*....Indianapolis, Ind.
Terre Haute & So.-Eastern Ry. 4-9 g. 44 m. 2 lo. 145 c
Geo. Atherton, *Supt*....Terre Haute, Ind
Texas-Mexican Ry. (*See Mex. Nat.*
Texas Trunk R. R. 4-8½ g. 36 m. 2 lo. 8 cars
Hugh Irwin, *Gen. Supt*....Dallas, Tex
Texas Western Ry. 3 g. 52 m. 2 lo. 44 cars
Henry Hatch, *Gen. Man*....Houston, Tex
T. F. Glispin, *M. M*....Houston, Tex.
Texas & N. O. R. R. (*See Cen. Pac.; G. H. & S. A. Div.*
Texas & Pacific. (*See Mo. Pac. Ry.; (6) Div.*
Texas & St. Louis Ry. 3 g. 769 m. 84 lo. 2,000 cars.
S. W. Fordyce, *Rec. and Gen. Man.* St. Louis, Mo.
C. S. Brooke, *Pur. Agt*....St. Louis, Mo.
M. C. B....Pine Bluff, Ark.
Mo. & Ark. Div.:
J. W. Brown, *Supt*....Pine Bluff, Ark.
Rich. Williams, *M. M*....Pine Bluff, Ark.
Tex. Div.: J. W. Dickinson, *Supt*....Tyler, Tex.
W. J. Lewis, *M. M*....Tyler, Tex.
Tionesta Valley R. R. 3 g. 15 m.
George Dickinson, *Gen. Supt*....Sheffield, Pa.
Tioga R. R. 4-8½ and 6 g. 67 m. 18 lo. 960 cars
L. H. Shattuck, *Supt*....Blossburg, Pa.
Pere Bonny, *M. M*....Blossburg, Pa.
D. H. Stratton, *M. C. B*....Blossburg, Pa.
Toledo, Ann Ar. & No. Mich. Ry.
4-8½ g. 63 m. 9 lo. 186 c.
J. M. Ashley, *Gen. Man*....Ann Arbor, Mich.
H. W. Ashley, *Supt. & Pur. Agt.* do
C. C. Dodge, *M. M*....Ann Arbor, Mich.
Toledo, Cin. & St. Louis R. R. 3 g. 798 m. 101 lo. 3,500 c.
W. H. Pettibone, *Gen. Supt*....Toledo, O.
F. W. Stewart, *P. Agt*....Toledo, O.
Thos. Robertson, *M. M*....Delphos, O.
Toledo Div.: W. H. Vandergrift, *Supt.*; do
J. S. Wiers, *For. Car Rep*....Delphos, O.
St. Louis Div.: Frank F. Allen....Charleston, Ill.
P. H. Murphy, *M. M*....Charleston, Ill.
Toledo, Peoria & Western R. R. 4-8½ g. 223 m.
E. N. Armstrong, *Supt*....Peoria, Ill.
Toledo & Indianapolis R. R. 4-8½ g. 43 m. 4 lo. 118 c.
David Robison, Jr., *Rec*....Toledo, O.
Toledo & Ohio Central R. R.
4-8½ g. 325 m. 46 lo. 4,760 cars.
T. M. Peelar, *Supt*....Bucyrus, O
F. W. Stewart, *Pur. Agt*....Toledo, O.
J. B. Morgan, *M. M*....Bucyrus, O.
Tonawanda Val. & Cuba R. R. (*See Brad., B. & K.*)
Toronto, Grey & Bruce Ry. (*See Canadian Pacific.*)
Toronto & Nipissing Ry. (*See Mid. Ry. of Can.*)
Troy & Boston R. R. 4-8½ g. 48 m. 20 lo. 484 cars.
D. Robinson, *Pres*....Troy, N. Y.
Joseph Crandell, *Supt*....Troy, N. Y.
C. H. Hubbell, *Pur. Agt*....Troy, N. Y.
Z. B. Davis, *M. M*....Troy, N. Y.
A. Brewer, *M. C. B*....Troy, N. Y.
Troy & Greenfield R. R. & H. Tunnel. 4-8½ g. 44 m.
A. W. Locke, *Man*....North Adams, Mass.
Tuckerton R. R. 4-9 g. 31 m. 2 lo. 29 cars
J. J. Pharo, *Supt. & Pur. Agt.* Tuckerton, N. J.

U

Ulster & Delaware R. R. 4-8½ g. 74 m. 10 lo. 218 cars.
Jas. H. Jones, *Supt*....Rondout, N. Y.
John H. Decker, *M. C. B*....Rondout, N. Y.
Union Ry. 5 g. 9 m. 3 lo.
C. E. James, *Pres*....Chattanooga, Tenn.
D. J. O'Connell, *Gen. Man* Chattanooga, Tenn.
Union Pacific Ry. (7 Gen. Divs.)
3 & 4-8½ g. 4,633 m. 510 lo. 10,550 cars.
S. R. Callaway, *Gen. Man*....Omaha, Neb.
Thos. L. Kimball, *Asst. Gen Man.* Omaha, Neb.
S. T. Smith, *Gen. Supt*....Omaha, Neb.
E. Dickinson, *Asst. Gen. Supt*....Denver, Col
J. J. Burns, *Gen. Store Keeper*...Omaha, Neb.
I. H. Congdon, *S. M. P. & C. D*...Omaha, Neb.
John Wilson, *Asst. do*....Omaha, Neb.
Neb. Div.: O. H. Dorrance, *Supt*....Omaha, Neb.
C. B. Havens, *Asst. Supt*....Omaha, Neb.
J. H. McConnell, *M. M*....Omaha, Neb.
Wyo Div.: C. E. Wurtele, *Supt*..Laramie, W. T.
G. W. Dickinson, *Asst. Supt*..Evanston, W. T.
T. A. Davies, *M. M*....Laramie, W. T.
Col. Div.: J. K. Choate, *Supt*....Denver, Col.
P. Touhy, *Asst. Supt*....Denver, Col.
F. Mertzheimer, *M. M*....Denver, Col.
Idaho Div.: R. Blickensderfer, *Supt.* Pocatello, Id.
Jno. S. Hickey, *M. M*....Pocatello, Id.
Kan. Div.: H. O. Brinkerhoff, *Supt.* Kan. City, Mo.
A. T. Palmer, *Asst. Supt*....Wallace, Kan.
J. O. Chapman, *M. M*....Armstrong, Kan.
T. B. Roberts, *M. C. B*....Armstrong, Kan.
Kansas Central Div.:
J. O. Brinkerhoff, *Supt*..Leavenworth, Kan.
Smoky Hill Div.:
O. H. Dorance, *Supt*....Wallace, Kan
J. B. Dailey, *Asst. M. M*....Ellis, Kan.
6 Salt Lake & Western Div.:
W. W. Riter, *Supt*....Salt Lake City, Utah.
United States Rolling Stock Co. 19 lo. 4,692 cars.
A. Hegewisch, *Pres*....New York, N. Y.
W. H. Chaddock, *Gen. Agt*....Chicago, Ill.
Utah Central Ry. 4-8½ g. 280 m. 21 lo. 358 cars.
John Sharp, *Gen. Supt*..Salt Lake City, Utah.
S. H. Hill, *Pur. Agt*....Salt Lake City, Utah.
Geo. G. Bywater, *M. M*..Salt Lake City, Utah
Peter Reid, *M. C. B*....Salt Lake City, Utah.
Utah & Nevada Ry. 3 g. 37 m. 3 lo. 33 cars
W. W. Ritter, *Gen. Man*...Salt Lake City, Utah.
Robert Anderson, *M. M*...Salt Lake City, Utah.
Utah & Northern Ry. (*See Union Pac.; (3) Div.*)
Utah & Pleasant Valley Ry. (*See Den. & Rio. Gr.*)
Utica, & Black Riv. R. R. 4-8½ g. 180 m. 25 lo. 412 c.
E. A. Van Horne, *Gen. Supt. & P. A*..Utica, N. Y.
H. W. Hammond, *Asst. Supt*....Utica, N. Y.
John Bailey, *M. M*....Utica, N. Y.
David James, *M. C. B*....Utica, N. Y.

V

Vaca Vall. & Clear Lake R. R. 4-8½ g. 30 m. 2 lo. 19 c.
G. B. Stevenson, *Gen. Supt*....Vacaville, Cal.
Valley Ry. (Ohio) 4-8¾ g. 75 m. 20 lo. 889 cars.
Isaac Reynolds, *Gen. Man*....Cleveland, O
H. Melcher, *Pur. Agt*....Cleveland, O.
C. T. Johns, *M. M*....Cleveland, O.
Valley R. R. Va. 4-8½ g. 62 m
S. Spencer, *Pres*....Baltimore, Md.
Vicksburg & Brunswick R. R. (*See Cen. of Ga.*)
Vicksburg & Meridian R. R. (*See Cin., N. O. & Tex. Pac.*)
Vicks. Shreveport & Pac. R. R. (*See C., N. O. & T. P.*)
Victoria Ry. (*See Midland Ry. of Can.*)
Virginia Midland Ry. (*See Rich. & Dan.; (4) Div.*)
Virginia & Truckee R. R. 4-8½ g. 52 m. 14 lo. 322 c.
Carson & Colorado R. R. 3 g. 294 m. 8 lo. 228 c.
H. M. Yerington, *Gen. Supt*....Carson, Nev.
R. J. Laws, *A. Supt.* (C. & Col.) Hawthorne, Nev.
Hume Yerington, *Pur. Agt*....Carson, Nev.
I. N. Fording, *M. M*....Carson, Nev.
M. M. Hyde, *M. C. B*....Carson, Nev.

W

Wabash, Chester & W'n R. R. (*See St. Louis Coal.*)
Wabash, St. Louis & Pacific Ry. (4 Gen. Divs.)
4-8½ g. 3,241 m. 598 lo. 17,230 cars.
Jas. F. Joy, *Pres*....St. Louis, Mo.
A. L. Hopkins, *V. P*....St. Louis, Mo.
A. A. Talmage, *Gen. Man*....St. Louis, Mo.
H. H. Wellman, *Pur. Agt*....St. Louis, Mo.
J. B. Barnes, *Supt. M. P. & M.* Springfield, Ill.
M. M. Martin, *Supt. Car Dept*....Decatur, Ill.
F. Howard, *M. C. B*....Toledo, O
(1) Eas'n Div.: G. W. Stevens, *Supt*....Peru, Ind.
W. S. Morris, *M. M*....Fort Wayne, Ind.
A. W. Quackenbush, *Asst. M. M*..Peru, Ind
Thos. Anderson, *M. C. B*....Peru, Ind.
(2) Middle Div.: K. H. Wade, *Supt*....Decatur, Ill.
C. F. Lape, *M. M*....Springfield, Ill.
B. B. Rose, *M. C. B*....Decatur, Ill.
G. A. Hurd, *Asst. Supt*....Decatur, Ill.
E. B. Hyde, *Asst. Supt*....Havana, Ill.
(3) Western Div.: R. G. Butler, *Supt*....Moberly, Mo
J. K. Lape, *M. M*....Moberly, Mo.
John Lang, *M. C. B*....Moberly, Mo.
D. Moin. Div.: C. F. Meek, *A. Supt.* Des Moines, Ia
Walden's Bridge R. R. 3 g. 23 m. 3 lo. 37 cars.
John G. Scott, *Gen Man*....Jenks P. O., Tenn.
Wallkill Valley.
J. E. Childs, *Gen. Supt*....New York, N. Y.
Geo. H. Graves, *Supt*....Kingston, N. Y
E. Minshull, *M. M*....Middletown, N. Y.
I. W. Fowler, *Pur. Agt*....Middletown, N. Y.
Walla Walla & Columbia Riv. R. R. (*See Ore. Ry.*)
Walton R. R. 5 g. 10 m. 1 lo. 7 cars.
D. H. Walker, *Pres*....Monroe, Ga.
Warren & Farnsworth Valley R. R.
3 g. 16 m. 3 lo. 39 cars.
A. D. Wood, *Gen. Man*....Warren, Pa
Warwick Valley R. R. (*See Leh. & Hud. River.*
Washington, Ohio & West. R. R. 4-8½ g. 52 m. 5 lo. 87 c
S. M. Brophy, *Supt*....Alexandria, Va
W. Mountjoy, *Act. For*....Alexandria, Va
John Harrison, *M. C. B*....Alexandria, Va
Waynesburg & Washington Rd. 3 g. 29 m. 3 lo.
C. E. Bower, *Supt*....Waynesburg, Pa
A. M. Kline, *M. C. B*....Waynesburg, Pa
Welland Ry. 4-8½ g. 25 m. 4 lo. 147 cars
William Pay, *Supt*....St. Catharines, Ont
Jas. Taylor, *M. M*....St. Catharines, Ont
Wm. H. Pay, *M. C. B*....St. Catharines, Ont.
West Feliciana R. R. 4-8½ g. 27 m. 2 lo. 22 cars
J. B. McGehee, *Pr. & Gen. Supt.* Bayou Sara, La.
J. A. Tilton, *M. M. & C. B*....Bayou Sara, La.
W. Va., Central & Pittsb'g Ry. 4-8½ g. 50 m. 4 lo. 119 c.
T. B. Davis, *Gen. Man*....Piedmont, W. Va
W. E. Porter, *Gen. Supt*....Piedmont, W. Va.
Geo. W. Harrison, *Pur. Agt*...Piedmont, W. Va
E. W. Lippencott, *M. M*....Piedmont, W. Va.
West & East R. R. (*See Ill. Cen.; N. O. Div.*)
West Jersey R. R. (*See Penn. R. R.; (3) Div.*)
Western R. R. (of Ala.) 5 g. 85 m. 15 lo. 270 cars.
Atlanta & W. Point Rd. 5 g. 87 m. 14 lo. 240 c.
Cecil Gabbett, *Gen. Man. & Supt*...Mont., Ala.
C. D. Wall, *M. M. & C. B*....Montgomery, Ala
Western Counties' Ry. 4-8½ g. 67 m. 8 lo. 137 cars.
J. Brignell, *Supt*....Yarmouth, N. S.
Western Maryland R. R. 4-8½ g. 127 m. 28 lo. 610 c.
J. M. Hood, *Pr. & Gen. Man*....Baltimore, Md.
R. J. Adair, *Pur. Agt*....Baltimore, Md.
David Holtz, *Mast. of Mach*..Union Bridge, Md
J. H. Nussear, *M. C. B*....Union Bridge, Md.
Western No. Carolina R. R. 5 g. 210 m. 17 lo. 160 c.
E. B. Thomas, *Gen. Man*....Richmond, Va.
Peyton Randolph, *Asst. G. M*..Salisbury, N. C
V. E. McBee, *Supt*....Salisbury, N. C.
Jos. P. Minetree, *Pur. Agt*....Richmond, Va.
G. W. Gates, *M. M*....Salisbury, N. C.
Western & Atlantic R. R. 5 g. 138 m. 58 lo. 952 c.
R. A. Anderson, *Gen. Supt*....Atlanta, Ga.
A. B. Bostwick, *Asst. Supt*....Atlanta, Ga.
Lamar Collier, *M. M*....Atlanta, Ga
Wm. Kinyon, *M. C. B*....Atlanta, Ga,
Wheeling, Pittsburg & Baltimore R. R. (*See B. & O.*)
Wheeling & Lake Erie R. R. 267 m. 37 lo. 1,922 c.
M. D. Woodford, *Rec. & Gen. Man*..Toledo, O.
O. P. Dunbar, *Gen. M. M*....Norwalk, O.
John Hillhouse, *Div. M. M*....Norwalk, O.
Cleve. & Mar. Div.: P. Pease, *Rec. & Gen. Man.*
Alex. Galloway, *M. M*....Cambridge, O
Whitby, Port Perry & Lindsay Ry. (*See Mid. of Can.*
White Water R. R. (*See Ft. W., Cin. & Lou.*)
Whitefield & Jefferson R. R. (*See Bos., Con. & Mon.*)
Whitneyville & Machiasport R. R. 8 m. 2 lo. 48 c.
C. Sullivan, *G. M. & Pur. Agt.* Whitneyville, Me.
Wicomico & Pocomoke R. R. 4-8½ g. 30 m. 2 lo. 38 c.
L. Showell, *Pres*....Berlin, Md.
Williamsport & North Branch R. R.
4-8½ g. 14 m. 2 lo. 4 cars.
B. G. Welch, *Man. & P. Agt*...Hughesville, Pa.
Williamstown & Del. River R. R.
4-8½ g. 27 m. 1 lo. 12 cars.
Samuel Garwood, *Supt*....Williamstown, N. J
Wilmington, Columbia & Augusta R. R. (*See W. & W.*)
Wilmington & No'n R. R. 4-8¾ g. 85 m. 17 lo. 155 c.
A. G. McCausland, *Supt. & P. A.* Wilmington, Del
George Rommel, *M. M*....Wilmington, Del.
Alex. Maitland, *M. C. B*....Wilmington, Del.
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H. Walters, *Gen. Man*....Baltimore, Md.
J. F. Divine, *Gen. Supt*....Wilmington, N. C.
John Bisset, *M. M*....Wilmington, N. C.
W. H. Day, *M. C. B*....Florence, S. C.
J. H. Davis, *M. C. B.* (W. & W.) Wilmington, N. C
Winifrede R. R. 4-9 g. 5 m. 1 lo. 65 cars.
Theodore Wright, *Pres*....Philadelphia, Pa.
Windsor & Annapolis Ry. 4-8½ g. 130 m. 10 lo. 160 c.
P. Innes, *Gen. Man*....Kentville, N. S.
Wm. Yould, *M. M*....Kentville, N. S.
Wm. Grierson, *M. C. B*....Kentville, N. S.
Wisconsin Central R. R. 4-8½ g. 480 m. 59 lo. 1,800 c
F. N. Finney, *Gen. Man*....Milwaukee, Wis.
A. A. Allen, *Asst. Gen. Man*..Milwaukee, Wis.
E. K. Howes, *Pur. Agt*....Milwaukee, Wis.
H. A. Barnes, *M. M*....Stevens Pt., Wis.
Mil. East. & No. Divs.:
F. A. Merrill, *Supt*....Milwaukee, Wis.
Wis. & Minn. and Minn. St. C. & Wis. R. R.'s.:
G. T. Wiswell, *Supt*....Chippewa Falls, Wis.
Mid. & No. Div.: P. Walling, *Supt.* Mil'ukee, Wis
Wisconsin, Iowa & Nebraska.
G. C. McMichael, *Supt*....Marshalltown, Ia.
J. V. Johnston, *Pur. Agt*....Marshalltown, Ia.
M. C. Wheeler, *M. M*....Marshalltown, Ia.
Wisconsin & Michigan R. R. (*See Mil. & North'n.*)
Wisconsin & Minnesota R. R. (*See Wis. Cen.*)
Woodruff Sleeping & Parlor Coach Co.
Job H. Jackson, *Pres*....Philadelphia, Pa.
Wm. G. Johnston, *V-Pres*....Philadelphia, Pa.
J. C. Paul, *Gen. Man*....Philadelphia, Pa.
R. A. Rutherford, *Supt*....Philadelphia, Pa.
Wood River Branch R. R. 4-8½ g. 6 m. 2 lo. 3 cars.
L. M. Barber, *Supt*....Hope Valley, R. I.
Woodstock R. R. 4-8½ g. 14 m. 1 lo. 3 cars.
J. G. Porter, *Supt*....Woodstock, Vt.
Worcester, Nashua & Rochester R. R.
4-8½ g. 95 m. 20 lo. 523 cars.
Chas. Howard, *Gen. Man*....Worcester, Mass.
G. W. Hurlburt, *Supt*....Worcester, Mass.
A. R. Barrett, *M. M. & C. B*..Worcester, Mass
Worcester & Shrewsbury R. R. 3 g. 3 m. 3 lo. 9 c.
J. F. Bigelow, *Supt*....Worcester, Mass.
G. E. Hapgood, *Pur. Agt*....Worcester, Mass.
Chas. Cleveland, *M. M*....Worcester, Mass.
Worcester & Somerset R. R. (*See N. Y., Phil. & Nor.*)

Y

York & Peach Bottom Ry. 3 g. 40 m. 5 lo. 100 c.
S. M. Manifold, *Supt. & Pur. Agt*....York, Pa.
G. W. Hoover, *M. M*....York, Pa.

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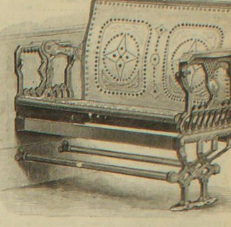

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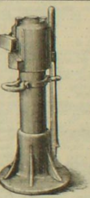

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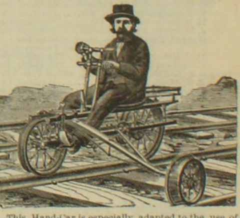

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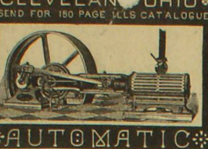

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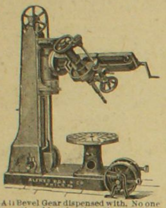

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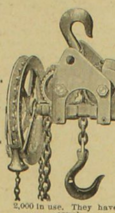

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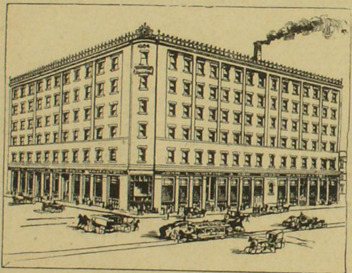

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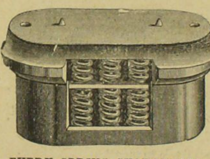

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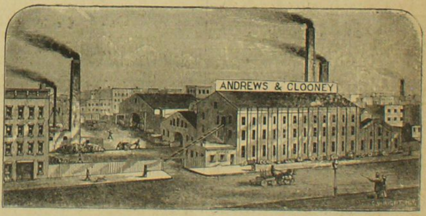

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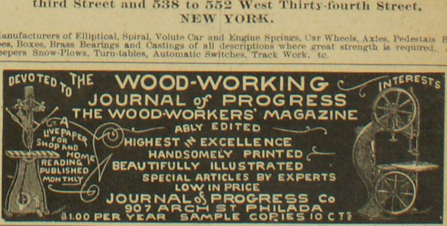

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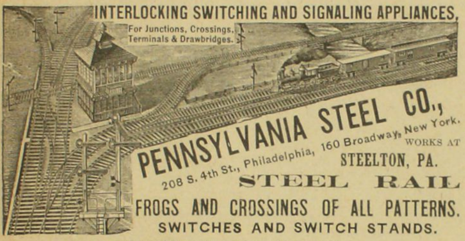

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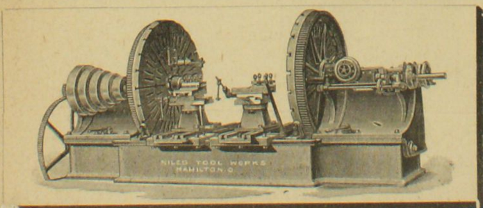

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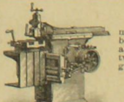

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